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ABSTRACT

Recognizing that punishment for aggression often is noneffective or inadvertently reinforces the aggressive act, the authors discuss an alternative approach and provide an explanation of the exchange theory of aggression. Three classroom experiments, operated with children chosen as the most severe behavior problems in a local school system, are reported. Teachers were initially allowed to teach as they usually would to provide baseline data. Observational reports showed chaotic classrooms with the teachers rewarding aggressive behavior. Token exchange systems were introduced according to the needs of the classroom. Anecdotal records and tables of data showed substantial reduction of hyperactive behavior and destructive acts with a resulting significant increase in attention level and class cooperation. Reversals of the conditions with the return to the baseline, no token exchange environment, showed a return to the original aggressive behavior, however, when the token exchange system for cooperation was reinstated, a significant decrease of aggressive acts resulting in a more productive learning environment was noted. Case studies detail the effects of the exchange system on two pupils and show the effect of restructuring the rewards in token exchange programs which were not immediately effective. (WW)

ED035140

REPORT 1

PROGRAM ACTIVITY 12

DIRECTOR: ROBERT L. HAMBLIN

STRUCTURED EXCHANGES AND CHILDHOOD LEARNING: HYPERAGGRESSIVE CHILDREN

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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THE HYPERAGGRESSIVE CHILD

In the long run, civilized cultures are not aggressive children. To illustrate the point, in a recent survey in England, primary teachers were asked to name types of student behavior a) which they felt disrupted the classroom most; and b) created in themselves the strongest feelings of anxiety. (Education and World Order) In response to the first question, 72% ranked aggressive behavior first, and in answer to the second, 76% ranked aggressive behavior first. This study also suggested that aggressive exchanges with the teachers produced unanticipated costs for the child. The dropout rate of hyperaggressive children was 2½ times as great as for "normals". Moreover, children with aggressive records tended to be over-represented at the local clinic for maladjusted juveniles. The report ends by suggesting that if hyperaggressive children could be placed in therapeutic nursery schools to be treated prior to their admission into the general school system, the cost to these children, their teachers, and to the community might be decreased substantially.

While this report oversimplifies the solution, at least it framed the problem. In spite of its sometimes short run benefits to the aggressor, the long run costs in civilized cultures are high, sometimes extremely high. The traditional "treatment" for aggression has been to punish it systematically, often harshly. While effective with some, punishment is an utter failure with others. Besides, it smacks of fighting crime with crime. But what alternatives are there to punishment? Alternative therapies for hyperaggression ordinarily grow out of alternative theories of and/or conceptions about the nature of hyperaggression.

The Frustration Theory of Aggression

In recent years, one alternative therapy had developed based on Freud's theories of aggression. In one formulation, Freud thought of aggression as a basic drive or "death instinct" analogous to other physiological drives such as those for eating, drinking and sleeping. (Jones, 1924) In this theory, he utilized a hydraulic model of personality in which there was an energy build-up of the aggressive drive to the point of bursting the defenses erected by the ego and the superego. In another formulation, Freud conceived of aggression as the "primordial (unlearned) reaction" to the frustrations inherent in social life. The major therapeutic strategy implied by both theories is that of "cathartic drainage" which is illustrated in the following extract from an influential textbook for teachers and parents:

> When pus accumulates and forms an abscess, it must be opened and drained. If this is not done, it may destroy the individual. Just so with feelings. The hurts, fears and angers must be released and drained. Otherwise, these too may destroy the individual. When enough fear, anger, and hate have been released, they diminish. They stop pushing from within. After enough of the "badness" comes out, the "goodness appears. (Baruch, 1957)

Freud's theories were formerly stated by Dollard, Doob, Miller, Mower and Sears in their famous little book, Frustration and Aggression (Dollard et al., 1939). In that statement, the catharsis hypothesis is rendered thusly: "the occurrence of any act of aggression is assumed to reduce (temporarily) the instigation to (further) aggression." However, catharsis is just part of their instigation theory of aggression.

When an individual is motivated and thus starts working, progressing toward a goal, then any interference with this work or progress to complete the sequence leads to frustration. The "dominant" reaction to frustration is overt aggression. Thus in their model, interference is the stimulus which produces frustration which is held to increase the level of the aggressive drive. This heightened aggressive drive condition leads to overt aggressive responses, but the overt aggressive responses produce a feed-back, i.e., the alleged cathartic reduction of the aggressive drive following each overt aggressive response.

In terms of this model, the control of aggression may be obtained 1) by avoiding any interference, i.e., the stimuli which produce frustration, or 2) by allowing the individual to express aggression freely. Supposedly the individual would keep on responding aggressively until catharsis obtained, until the tension associated with the aggressive drive is not incrementally relieved by further overt aggression.

These two strategies for the reduction of aggression have been embodied in several therapeutic designs. For example, consider the attempt by Redl and Ulineman to control aggression by holding "group therapy" sessions in a deliberately created "hygenic atmosphere", that is, a social structure from which the unconditioned and conditioned stimuli which are held to cause aggression are systematically removed and where constant opportunities for catharsis prevail. (Redl and Ulineman, 1957) At Summerhill, A. S. Neill also designed a permissive social structure in which frustration stimuli were allegedly taken out of the system, (Neill, 1961). Unfortunately, however, these "experiments" were not designed to provide rigorous data to test the validity of the theoretical assumptions used in their desi

Nevertheless, in the laboratory, the turn-pin of the instigation theory, the catharsis hypothesis, has not fared well at all. A summary of some of the more important studies are given in Table 3.1. Note that the results are mixed. Overt aggression decreased aggressive drive in some experiments and increased it in others. Furthermore, the relationships are weak (the predictive accuracy of the change in aggressive drive is low, on the average less than 10%). Much has been written in an attempt to reconcile these results. However, let us simply observe that a theory which would generate such weak, inconsistent evidence is hardly worth the serious attention of scientists or therapists.

Instinct or Reflex-Aggression Theories

Even so, old theories apparently seldom die. They just change their make-up, presenting a new face to the world. However, in the last few years, "new" instigation theories have nervously dropped the catharsis hypotheses. They simply allege that aggression is instinctual, that it is programmed genetically as an automatic response to specific stimuli. For example, a zoologist, Ardery (1966)in a persuasive book which has received considerable notice, The Territorial Imperative, assumes that aggression is biologically or genetically determined, that is, it is altogether unavoidable. In support of his thesis, Ardery has amassed considerable evidence to suggest that animals fight instinctively, reflexively, when another of their species invades their territory. Azran *et al*. (1965) have conducted a brilliant series of experiments testing for a pain-aggression reflex in animals. However, their results are mixed to this point. While most of the animals which they've tested

TABLE 3.1*

TESTS OF CATHARSIS HYPOTHESIS--VICARIOUS FORMULATION

Author	Independent Variable(s)	Dependent Variable(s)	Subjects	Relationship	Explained Variance (%)**
Bandura, Ross, Ross	a) Exposure to aggressive models b) Frustrated (mildly)	Aggressive doll play	Children	Negative	...
Lovaas	Exposure to aggressive cartoon	Aggressive doll play	Children	Negative	22.7
Mussen, Rutherford	a) Exposure to aggressive cartoon b) Frustrated	Balloon popping	Children	Negative	28.4
Siegel	Aggressive cartoon	Aggressive doll play	Children	Negative	...
Walters, Thomas	Aggressive film	Delivering electric shocks --duration and intensity	Adults (males)	Negative	14.2 8.5
Berkowitz, Rawlings	a) Angered b) Aggressive film c)"Justified" aggression	Questionnaire responses	Male and female college students	Negative	7.6
Feshback	a) Angered	Word association test	Male and female college students	Positive	2.3

*Source: Forthcoming publication by Hamblin, Ellis, and Chadwick. Formulae enabling one to convert t and F scores into measures of explained variance are contained in Hays, Statistics for Psychologists.

**Explained variation. Where percentages are not presented, the reader may assume that the established reporting in the original has not permitted us to transform results into a measure of explained variance.

do respond aggressively to pain stimuli above a certain threshold, the aggressive response does not occur every time as one might expect of a reflex, at most say 90% of the time. Even if there were not these problems of evidence, generalizetion of these animal findings to man would be questionable. Just because a zoologist or a comparative psychologist is able to demonstrate a series of nest building reflexes for a certain species of birds , he does not thereby demonstrate _ipso facto_ that the same reflexes occur in other species of birds, not to mention in man.

In addition to being questionable when applied to man, these instinct or reflex theories of aggression are dreary. They have led many authors, even prominent ones like Ardrey, to argue for the inevitability of war and of other forms of aggression. Of course, their arguments are not quite true; there is an alternative, even within the framework of instinct or reflex theory. This alternative, now being pursued by the biochemists, is to find a pacification drug or family of pacification drugs. If the reflex theories of aggression were true for man, certainly this would be the only feasible form of therapy. Although the experimental evidence is just beginning to come, a number of biochemists seem to be making progress in their search for such drugs.

The Hyperactivity Theory

A third biological theory, this time of aggression in children, has been largely ignored in the behavioral sciences. This theory, developed primarily by a number of pediatricians, holds that hyperaggression in children is simply part of a more general

TABLE 3.[illegible]*

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hyperactive syndrome. The hyperactive syndrome was first described by a prominent English pediatrician, Dr. George F. Still, in 1902 (Still, 1902). Then in 1923, Dr. Franklin C. Ebaugh reported the syndrome in a group of children from the Philadelphia area who had contracted sleeping sickness and as a result, suffered definite brain damage (Ebaugh, 1923). This study led to the conclusion that the hyperactive syndrome was simply the result of a certain type of brain damage. However, while subsequent research revealed that while some kinds of brain damage do result in hyperactivity, only about 10% of all of the children who are diagnosed as being hyperactive are, in fact, brain damaged, (Chess, 1960; Stewart, 1966).

Then a number of researchers turned to testing the hypothesis that a specific biochemical imbalance in the brain produced the hyperactive syndrome. At first these researchers tried various barbituates, i.e., sedatives, to tranquilize hyperactive children, but early in the 1930's, child psychiatrists realized that these drugs tended to aggravate the children instead of helping them. Then Charles Bradley, a director of a home for disturbed children in East Providence, Rhode Island, tried amphetamines, i.e., stimulants, on hyperactive children and oddly enough, these drugs had a calming effect. Amphetamines have been successfully used since Bradley's first report in 1937 (Signor, 1967). As Steward observes, "We do know that there is not another condition in psychiatry that responds so dramatically to drugs. It happens in about half of the children but it is an obvious change. The children simply turn into different beings."

A third theory is that the hyperactive syndrome occurs because of a delay in the development or the maturation of the brain of some hyperactive children (Signor, 1967). However, there is no concrete evidence which specifies the physical nature of the delay or where exactly in the brain it occurs. It is just that some hyperactive children are physically immature in comparison with their age mates; they are often smaller, often less well-coordinated, and their speech often is not as clear. In other words, the brain just is not functioning at the level which might be expected by the hyperactive child's chronological age.

Even so, the hyperactive problem is serious for the child, as well as for his parents during those crucial younger years. Typically, the hyperactive child, even when he does respond favorably to the stimulant family of drugs, does not progress well in school. He ordinarily is a miserable child, who gets categorized as a bad boy who makes life miserable for all those around him--his parents, his teachers, his classmates. Yet, if Dr. Stewart's estimate is accurate, on the basis of surveys in schools, there are at least three or four hyperactive children in every one hundred (Stewart, 1966; Signor, 1967). Most classes in public schools have at least one hyperactive child who accounts for most of the discipline problems; who cannot concentrate; who cannot complete academic projects; who continually disrupts the class, and in the process, fails to learn. They get behind in school as much as three and four years. Thus the hyperactive, in a very special sense, is a retarded child. Like other retarded children, the worst hyperactives end up in special school districts, usually in very small classes. However, what proportion of hyperactives are hyperaggressive?

A preliminary indication is given by data gathered by Stewart and his associates who systematically compared the symptoms of a group hyperactive syndrome. The hyperactive syndrome was first described by a prominent English pediatrician, Dr. George F. Still, in 1902 (Still, 1902). Then in 1923, Dr. Franklin C. Ebaugh reported the syndrome in a group of children from the Philadelphia area who had contracted sleeping sickness and as a result, suffered definite brain damage (Ebaugh, 1923). This study led to the conclusion that the hyperactive syndrome was simply the result of a certain type of brain damage. However, while subsequent research revealed that while some kinds of brain damage do result in hyperactivity, only about 10% of all of the children who are diagnosed as being hyperactive are, in fact, brain damaged, (Chess, 1960; Stewart, 1966).

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A preliminary indication is given by data gathered by Stewart and his associates who systematically compared the symptoms of a group of hyperactive children whom they were treating as patients with those of a control sample taken from the first-grade classes of two suburban schools which serve families of a socio-economic level generally equal to that of the families of the patients. The data in Table 3.2 show the major characteristics of the hyperactive syndrome. As noted, hyperactive children tend to be overactive, fidgety, unable to complete projects, unable to sustain games, unable to sit still, and they talk too much. Also note that about 50 to 60% of the patients show the symptoms of hyperaggression--fighting, teasing, having temper tantrums, being irritable, being unresponsive to discipline and being defiant. These symptoms, with the exception of teasing, almost never occur in the controlled sample (Stewart, 1966)

In a private communication, Dr. Stewart has noted that the 50% or so who respond so favorably to the stimulant family of drugs are not the hyperaggressive hyperactives. The hyperaggressives tend to be robust, well-developed in stature. The ones who respond the best to amphetamines tend to be puny, under-developed physically. Thus, there appear to be two hyperactive syndromes, the one involving underdeveloped children, which, according to the evidence appears to be righted to a large extent by therapy using the stimulant family of drugs. The second syndrome, however, the one involving hyperaggressive children, seems to be unresponsive, to date, at least, to any specific biochemical therapy.

The Exchange Theory of Aggression

While all of the above theories are interesting and are not without supporting evidence, none have led to a therapy that is effective

TABLE 3.2

PER CENT POSITIVE SCORES IN THE HYPERACTIVE AND CONTROL GROUPS FOR SYMPTOMS SCORED POSITIVE IN ONE-THIRD OR MORE OF THE HYPERACTIVE GROUP

Symptom	Group	
	Hyperactive	Control
Overactive	100	33
Can't sit still	81	8
Restless in M.D.'s waiting room	38	3
Talks too much	68	20
Wears out toys, furniture, etc.	68	8
Fidgets	84	30
Gets into things	54	11
Unpredictable	59	3
Leaves class without permission	35	0
Unpredictable show of affection	38	3
Constant demand for candy, etc.	41	6
Can't tolerate delay	46	8
Can't accept correction	35	0
Temper tantrums	51	0
Irritable	49	3
Fights	59	3
Teases	59	22
Destructive	41	0
Unresponsive to discipline	57	0
Defiant	49	0
Doesn't complete project	84	0
Doesn't stay with games	78	3
Doesn't listen to whole story	49	0
Moves from one activity to another in class	46	6
Doesn't follow directions	62	3
Hard to get to bed	49	3
Enuresis	43	28
Lies	43	3
Accident prone	43	11
Reckless	49	3
Unpopular with peers	46	0

SOURCE: Stewart *et al*. "The Hyperactive Child Syndrome," *American Journal of Orthopsychiatry*, XXXVI, *5*, 1966, p. 864.

with hyperaggressive children. This may be in part, at least, because these theories ignore the role of learning. Man is the most adaptable, the least programmed genetically of all animals. Consequently, response patterns in man, even those which seem to be the most automatic, the most habitual, are in almost all cases, learned or conditioned.

This may be the situation with aggression; it may just be a learned pattern. Some cultures, some families, are brazen; they openly, systematically teach and reward their young to aggress against certain classes of people. The status, the booty, the bargaining advantages which all too often accrue to the successful aggressor, then become ample reward to maintain the habitual response pattern. However, most cultures, including our own, at least are ambivalent. The young are also taught not to use aggression. In fact, exchanges are typically structured to promote its nonuse, to substitute less harmful habitual response patterns. But even in such cultures, aggression is sometimes reinforced consistently in exchanges that parents or teachers sometimes inadvertently structure. Thus, in designing our experiment for taming hyperaggressive boys, we decided to take seriously, perhaps for the first time, the theory that aggression is a type of learned behavior which is learned and maintained via extant structured exchanges, and nothing else. If true, this suggests that to change an aggressive pattern, it is necessary to restructure appropriately the exchange systems in which the boys participate and to let the boys work this restructured system over and over again, until they develop a new habitual response pattern.

Experiment I

This first experiment was conducted by Desmond Ellis and the first author; the first ever done in the Social Exchange Laboratories.

The first problem was finding worthy subjects. We ended up with five unbelievably aggressive four-year old boys, all referred to us by local psychiatrists and social workers. All were disgnosed as hyperactive and none had responded to amphetamine therapy.

Next a trained teacher was hired. After we told her about the boys and the general nature of the experiment, she was "given her head": that is, given the opportunity to use her previous training to develop her own system during a first or baseline period (A^1). We hoped she would respond as the typical teacher would in our culture. Whether she did we may never know, but we suspect she may have. She tried to play several roles: the strict disciplinarian, the wise counselor, the clever arbitrator, the sweet peacemaker. However, she failed miserably in all of these. As the data in Figure 3a show, the frequency of aggressive sequences increased sharply in A; until after the eighth day, the average was about 160 sequences per day. 160 aggressive sequences per day! What were these like? The following is a series of eleven sequences, as we scored them, which are not atypical of what went on.

> Mike, John and Dan are seated together on the hardboard playing with pieces of Playdoh. Barry, some distance from the others, is seated and also is playing with Playdoh. The children, except Barry, are talking to each other about what they are making. Time is 9:10 a.m. Mrs. Golden, the

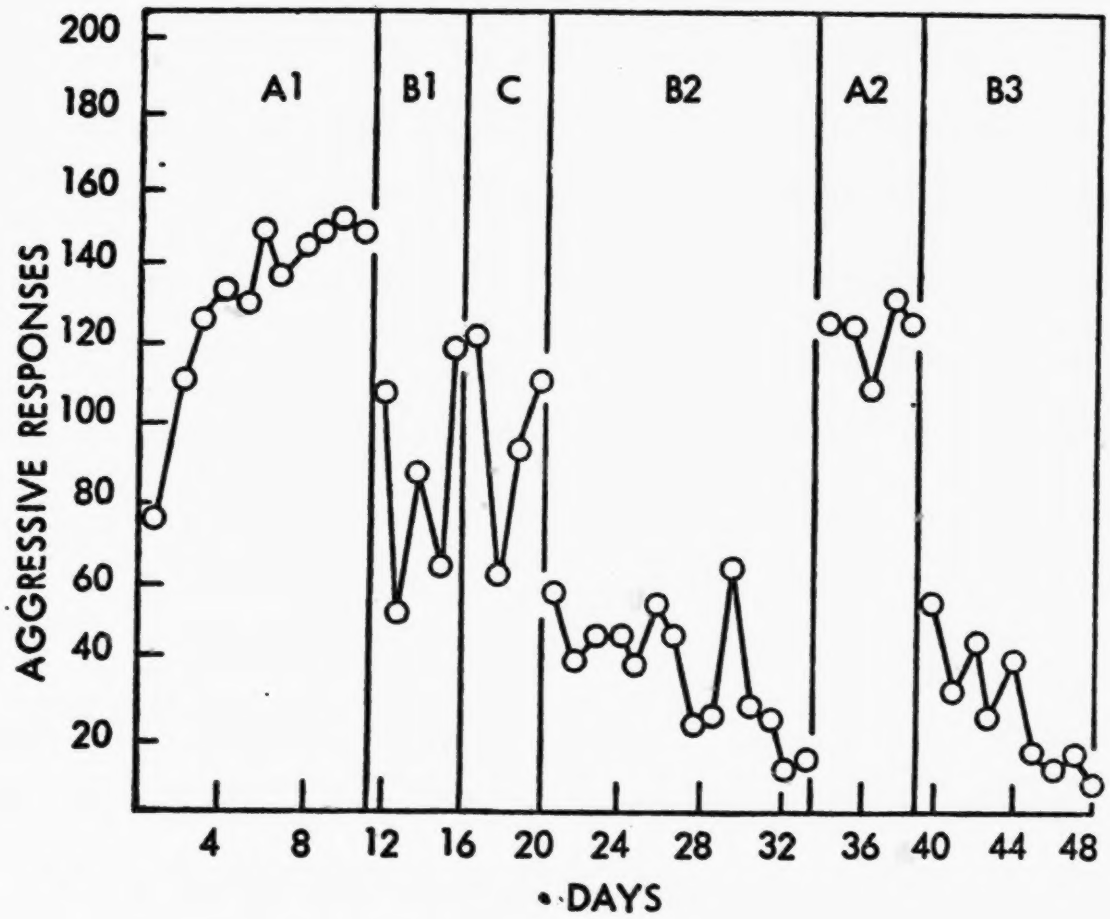

FIGURE 3a. Frequency of aggressive sequences by days for five four-year old boys for 6 experimental conditions. In A1, C, and A2, the teacher attempted to punish aggression but inadvertently reinforced it: in B1, B2 and B3 she turned her back or otherwise ignored aggression and thus did not reinforce the pattern.

teacher, turns toward the children and says, "It's time for a lesson. Put your Playdoh away." Mike says, "Not me." John says, "Not me,"; Dan says, "Not me." Mrs. Golden moves toward Mike. Mike throws his Playdoh in Mrs. Golden's face. Mrs. Golden jerks back, then moves forward rapidly and snatches Playdoh from Mike. Puts Playdoh in her pocket. Mike screams for Playdoh, says he wants to play with it. Mike moves toward Mrs. Golden and attempts to snatch the Playdoh from her pocket. Mrs. Golden pushes him away. Mike kicks her on the leg; kicks her again, and demands the return of his Playdoh; kicks her again; picks up a small steel chair and throws it at Mrs. Golden. She jumps out of the way. Mike picks up another chair and throws it more violently. Mrs. Golden cannot move in time and chair strikes her foot. Mrs.Golden pushes Mike down on the floor. Mike starts up, pulls over one chair, now another, another; stops a moment. Mrs. Golden is picking up chairs, Mike looks at Mrs. Golden. She moves toward Mike. Mike runs away. John wants his Playdoh. Mrs. Golden says no. He joins Mike in pulling over chairs and attempts to grab Playdoh from Mrs. Golden's pocket; she pushes him away roughly. John is screaming that he wants to play with his Playdoh; moves toward gramophone, pulls it off the table and lets it crash onto the floor. Mike has his coat on, says he is going home. Mrs. Golden asks Dan to bolt the door. Dan gets to the door at the same time as Mike. Mike hits Dan in the face. Dan's nose is bleeding. Mrs. Golden walks over to Dan, turns to the others and says that she is taking Dan to the washroom and that while she is away, they may play with the Playdoh. Returns Playdoh from pocket to Mike and John. Time: 9:14 a.m.

Wild? Very. These were barbarous, tough little boys who enjoyed doing battle. Mrs. Golden did her best to be firm, to be a peacemaker, to interest the boys in school, to discipline them, but as fighters they were just much more clever than she, and they always won. Whether Mrs. Golden wanted to or not, they could always drag her into the fray, and instead of giving up when the giant threatened, they just went to it harder and harder until she finally capitulated. She was finally driven to their level, trading a kick for a kick and spit in the face for spit in the face.

However, it would be an error to judge Mrs. Golden too harshly. What she did not realize is that she had inadvertently structured an exchange where she consistently rewarded and thus reinforced the boys' aggressive behavior. This happened in two ways. First whenever she became embroiled in a fight with them, as noted, she always capitulated in the end. Second, more subtly, she inadvertently reinforced their aggressive pattern whenever she attended their aggression by looking, by talking, scolding, cajoling, becoming angry or even striking back. These boys were playing, as best we could tell, a game called "Tease the Teacher." The more she evidenced that she was troubled by their behavior, the better they liked it, and the more they continued the game.

Now, these interpretations may seem far-fetched, but they are borne out rather strongly by what happened later in the experimental series. On Day 12, we restructured the exchange system and thus began B^1. First we set up the usual token exchange to reinforce cooperative behavior. This was to develop or strengthen a pattern of behavior which would be a functional substitute for the boys' aggressive patterns. Any strong, habitual pattern of behavior serves some function for the individual, so the first step in getting rid of them is substituting another pattern which is similarly functional but less problematic, otherwise. This is for humanistic as well as therapeutic reasons.

To weaken the boys' habitual aggressive patterns directly, the teacher was instructed how not to reward, not to reinforce it. Contrary to all of her previous habits, she was asked not to attend aggression in any way, rather to ignore it, to turn her back on the aggressor, and at the same time, to engage the other boys in an activity or a lesson where she could reinforce cooperation with tokens. Although difficult for her at first, once we were able to coach her, to give her immediate feedback over a wireless communication system which we installed, she was able to restructure the exchange almost perfectly. The data in Figures 3a and 3b show the crucial changes which occurred--a gradual increase in the frequency of cooperation--from about 56 to about 115 sequences per day and a corresponding decrease in the frequency of aggression from about 160 to about 60 sequences per day.

Now these results should have been satisfactory, but we were new at this kind of experimentation and the baseline period had made us nervous. We wanted very much to reduce the frequence of aggression to a "normal" level, about 16 sequences a day. So at this

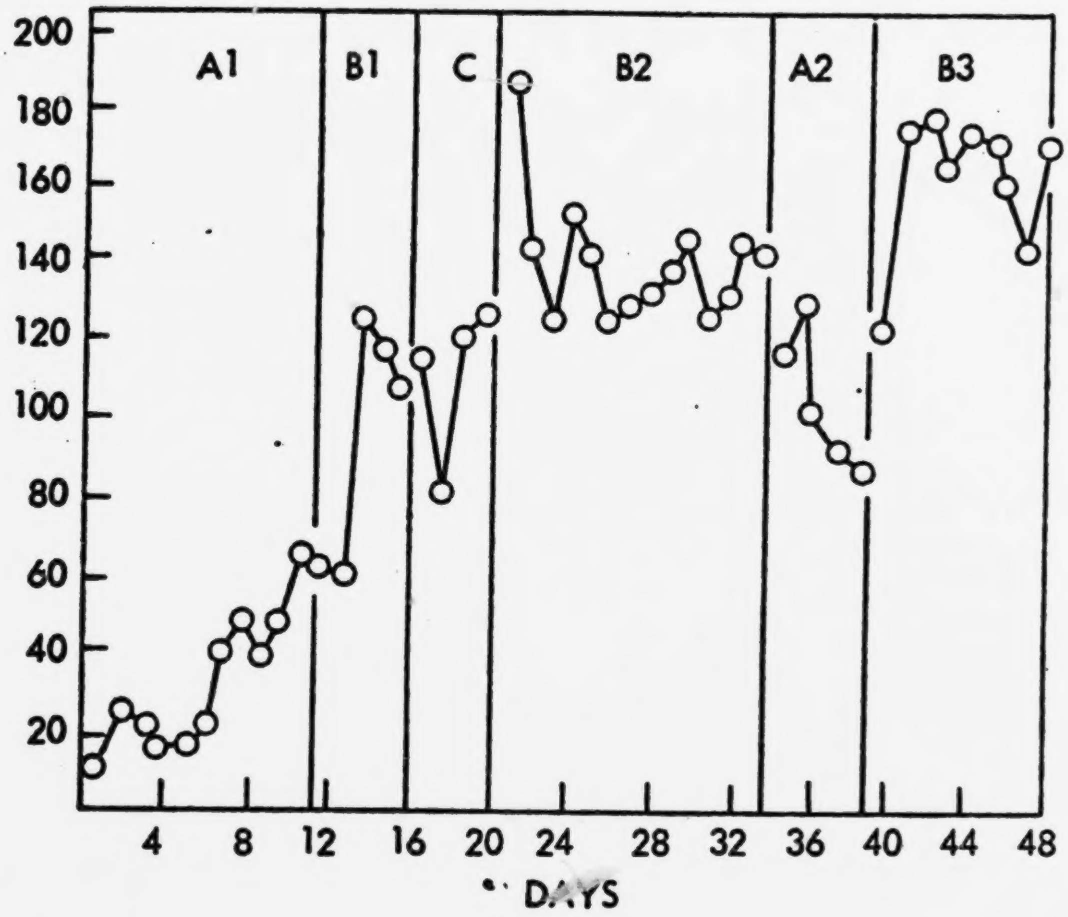

FIGURE 3b. Frequency of cooperative sequences for 6 experimental conditions. In A1 and A2, the teacher structured a weak approval exchange for cooperation and a disapproval exchange for non-cooperation. In B1, B2, B3 and C, she structured a token exchange for cooperation.

point, instead of letting a firm equilibrium obtain, we prematurely restructured the exchange system and thus launched C.

Victims of being reared in a culture which believes in punishing aggression, in C we simply restructured the system so aggression would always be punished effectively. The token exchange for cooperative behavior was kept in, but instead of ignoring aggression, the teacher was told to charge tokens for any aggression. This could be done effectively because a child could easily be made to pay any fine before purchasing admission to the movie, toys, etc.

What happened? To our surprise, the frequency of cooperation remained relatively stable, circa 115 sequences per day, but the frequency of aggression, instead of decreasing as expected, increased to about 100 sequences per day!. Evidently the boys were still playing "Tease the Teacher" and the troubled attention she inadvertently gave them while levying the fines was enough to reward and thus to increase the frequency, or reinforce, their aggressive pattern.

By this point in the experiment it became obvious that the boys had grown fond of Mrs. Golden, particularly Mike, John and Dan. They were always trying to sit by her, thus jogging for position was the source of many fights during this and later conditions. This particular condition, however, helped us to decide to get rid of the fining system.

> Time for reading. Mrs. Golden is sitting on the floor with all the boys except Mike. The boys are quite attentive, all listening raptly. Mike decides to join the reading circle, tries to edge in between Mrs. Golden and John. In an instant,

> John has his left arm locked around Mike's neck from the back and is choking him. Mike loudly cries and coughs for air. Mrs. Golden to John, "If you do that, it will cost you five tokens." John has tokens in the locking hand, releases momentarily, throws the tokens at Mrs. Golden. Before Mike or Mrs. Golden could react, the arm is again locked. Mike again is coughing and screaming. Mrs. Golden breaks the lock. John draws back, Mike stops crying. Mrs. Golden starts reading again.

Wild? This incident was so outlandish that the experimenters decided to correct the error, to reverse the exchange structure to what it was in B^1. Instead of fining the children for aggression, the teacher was again told to ignore it by turning her back and simultaneously involving others in a token exchange for cooperation.

What happened during B^2? As we had originally hoped, the frequency of aggression went down to a near "normal" level, about ly sequences per day, and cooperation increased to about 140 sequences per day.

Then, as originally planned, the conditions were again reversed. The token exchange was taken out: the boys were given ample tokens at the beginning of the morning to buy their usual supply of movie, toys, snack, etc. The teacher was told "to do the best she could", but was not instructed to return to her old pattern. However, without the tokens and without our coaching she did go back and with about the same results. The data in Figures 3a and 3b show that in A^2, aggression increased in frequency until it leveled off at about 138 sequences per day and cooperation decreased in frequency until it leveled off at about 124 sequences per day. While these levels show some improvement over those of A^1, the mixture of aggression and cooperation was strange, almost weird, to observe.

When the token exchange for cooperation was restructured and the teacher again stopped attending and otherwise reinforcing aggression in B^3, the expected changes occurred again. Aggression decreased in frequency ultimately to 7 sequences on the last day and cooperation increased to an average of 181 sequences per day or thereabouts toward the end. Our observations in "normal" nursery schools show that for five boys, the normal rates are about 15 sequences for aggression and 60 sequences for cooperation. Thus, by the end the boys had experienced a remarkable change. Instead of being hyperaggressive and hypocooperative, they were now hypoaggressive and hypercooperative! A most pleasing result.

To obtain a flavor for their behavior change, consider the following incident which is typical of the rest periods. (Rest periods during A^1 and A^2 were the setting in which the highest rates of aggression occurred.)

> All of the children are sitting around the table drinking their milk. John, as usual, has finished first. Takes his plastic mug and returns it to the table. Miss Hardt, the assistant teacher, gives him a token. Goes to cupboard, takes out his mat, spreads it out by the blackboard and lies down. Miss Hardt gives him a token. Meanwhile, Mike, Barry, and Jack have spread their mats on the carpet. Dan

is lying on the carpet itself since he hasn't a mat. Each of them get a token. Mike asks if he can sleep by the wall. Mrs. Golden says yes. John asks if he can put out the light. Mrs. Golden says to wait until Barry has his mat spread properly. Dan asks Mike if he can share with him. Mike says no. Dan then asks Jack if he can share with him; Jack says yes, but before he can move over, Mike says yes. Dan joins Mike. Both Jack and Mike get a token. Mike and Jack get up to put their tokens in their cans. Return to their mats. Mrs. Golden asks John to put out the light; John does so; Miss Hardt gives him a token. All quiet now. Four minutes later--all quiet. Quiet still, three minutes later. Time: 10:23 a.m. Rest period ends.

Two or three incidents similar to the following occurred during A^1 or A^2 and at those points in time Mike had terminated them at once by punching Dan in the nose, causing it to bleed. But in B^3 his response was quite different:

The children are in the classroom, ushered there by the driver. Mike has some money, which he is showing others. Dan snatches a 10-cent piece from Mike's outstretched hand. Dan evidently wants to use the money in the candy machine upstairs. Mike moves toward Dan while asking for his money back. John asks Dan to give Mike's money back. Mike continues to ask Dan for his money. Now he warns Dan that he will not share money with him in the future. (On previous occasions Mike had stolen money from his mother--about $1.75--

> and had in fact distributed it among the boys.) Time: 9:04 a.m. Mrs. Golden arrives. Mike tells Mrs. Golden that Dan has taken his money. Mrs. Golden asks Dan, who nods and gives the dime back to Mike.

Apparently, Mike was not angered by Dan's snatching. True, he was manifestly bothered, but instead of anger and then direct aggression, Mike responded several times with a substitute pattern, asking. When asking did not work, he responded with a mild threat, i.e., that he would not share in the future, and finally, did what most civilized people would do, took the matter to someone in authority for adjudication. *His habitual response pattern to interference had changed*.!

While reacting positively to the overall results, some people are distressed by experiments like these where the experimental conditions are changed back and forth. In particular they ask, "Why take a system out when it has produced a beneficial change?" At our laboratories, it is done for two very practical reasons. First, such reversals are necessary to show conclusively the effect of a structured exchange on behavior, as social scientists learned from the famous Hawthorne experiments. It must be possible to reverse a change or the causal implications must always remain suspect. Needless to say, this first reason weighs heavily on us, for we are interested in discovering what the token and other exchanges produce and not what is produced by something we have failed to control. The second reason is humanitarian. We find that after a reversal, the new equilibrium is usually higher than the old one. In this experiment, the decrease in aggression was from 60 sequences per day in B^1 to 16 sequences in B^2 to 7 sequences in B^3. In addition, for cooperation we found the equilibrium in each of the successive B periods to be higher than the last one: 110 in B^1, 140 in B^2, and 181 in B^3. These are nice examples of the contrast effect.

In addition to their hyperaggressiveness, these little boys were washouts as students. The average attendance in A^1 of all the boys was circa 8% of the available lesson time (see Figure 3c). The teacher's system of scolding for non-attendance and non-scolding and faint approval for attendance was not at all effective.

When the token exchange was instituted in B^1, C, and B^2, it took a long, long time to have any appreciable effect. This was because the teacher was being trained from scratch to structure and to manage a token exchange and because our training procedures--minimal instructions in theory plus coaching before and after the school day--were just not effective. Finally, however, after two weeks, we obtained a wireless communication system, which allowed us to coach, to give immediate feedback to the teacher from behind the one-way mirror. From that time on, lesson attendance increased gradually, as expected, until toward the end of B^2 it equilibrated at about 75%. After the token exchange was taken out during A^2, attendance at lessons decreased to an equilibrium of about 23%. When the token exchange was restructured in B^3, attendance shot back up to an equilibrium which averaged about 93%. From 8 to 75 to 23 to 93%. These dramatic changes in lesson attendance occurred as the structured token exchange was put in, taken out, and finally put in again. Note that the over-all change from 8 to 93% is almost a 12-fold increase.

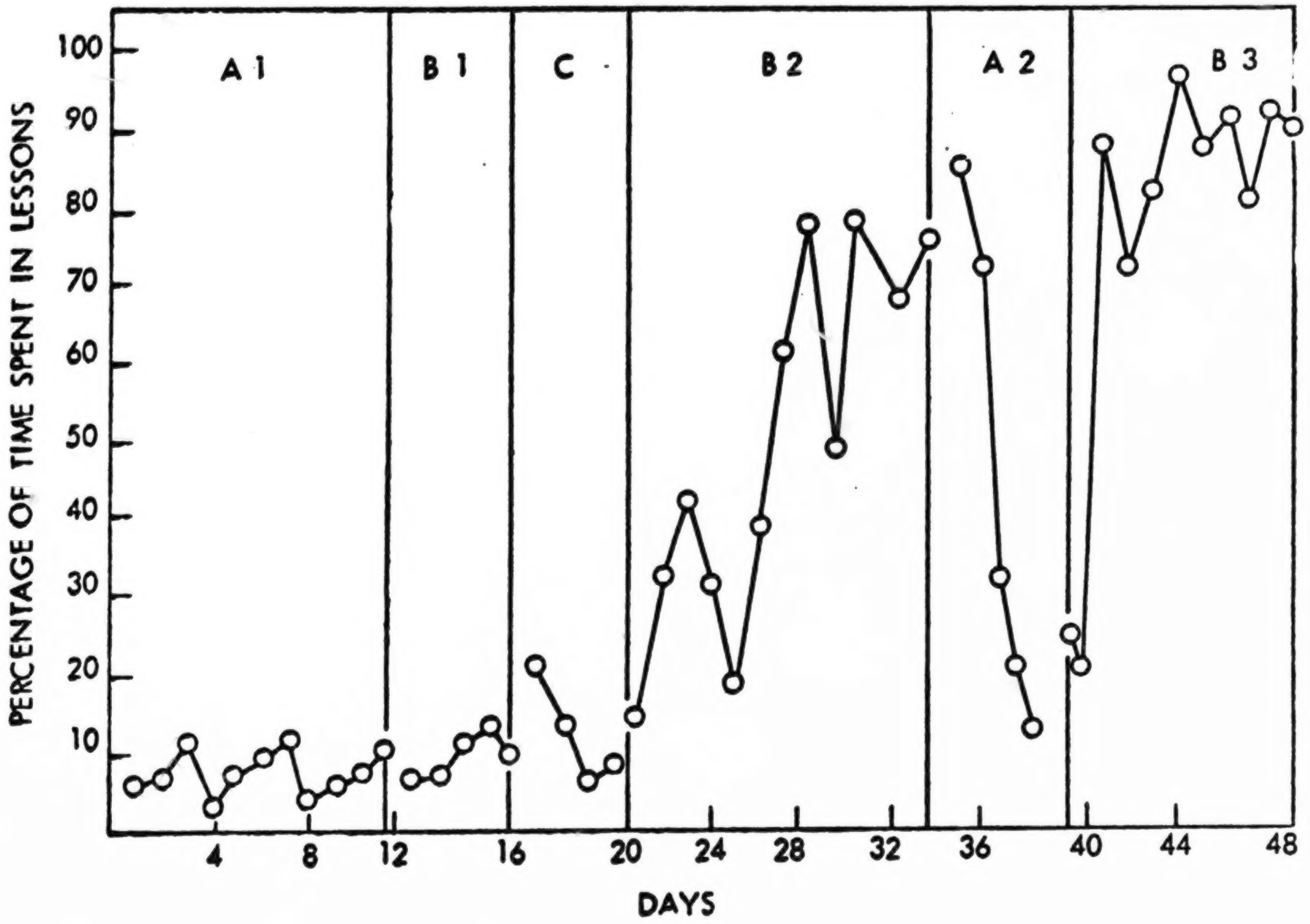

FIGURE 3c . Percentage of scheduled time spent in lessons by days for 6 experimental periods for five hyperaggressive boys. In A1 and A2 teacher structured approval exchange for attendance, disapproval for non-attendance. In B 1 and C, a token exchange for attendance was structured, but not effectively until B2 and B3.

With more normal children, the increase is at best 3-fold. Thus, well-structured exchanges have a high leveling effect; they do more for the disadvantaged than the advantaged.

Discussion

This first experiment was by far the most important ever done in the laboratories, for it convinced us of the almost miraculous influence of structured exchanges in maintaining and modifying the behavior of children. These were barbarous tough little boys who enjoyed doing battle and who were so clever at fighting that they always won. Yet, in a few weeks time, because the exchanges were restructured, the boys' habitual response to others changed. Our theories seem to be borne out about aggression, about cooperation, and perhaps about behavior in general.

However, the staff were not the only ones impressed. As word began to spread around the community that this wild experiment was in process, a number of people interested in youth began to visit at various intervals. Ultimately, these visits led to an invitation to the laboratories to run two special classes in one of the local school districts.

In the preliminary talks we asked them who were the most troublesome children in the system. They replied that hyperactive boys seemed to give the most difficulty. So we requested two classes of hyperactive boys, a younger group and an older group. In both the primary and intermediate classes which were finally assigned us there were four hyperactive boys, a teacher and an assistant teacher. The boys were on heavy medication prescribed by family pediatricians.

Nevertheless, they were too disruptive, too distractable to function in a normal classroom. We were told that they were the very worst cases in the system. All turned out to be the hyperaggressive type of hyperactives.

Experiment II

In the beginning as noted, the primary class involved four boys, six, seven and eight-year olds in the kindergarten, first and second grades. It was handled by a teacher, Mrs. Linden, and her assistant, Mrs. Snyder. In this we have changed the coding from simple aggression to disruptions, a special case of aggression directed mostly toward the teacher and used here because it is more descriptive of what is going on.

Disruptions were defined as any acts which noticeably distracted a teacher or another student from work or any activity which would undoubtedly bring immediate reprimand in a normal classroom. Such things as throwing pencils, tipping over the desks or chairs, fighting, yelling, swinging on doors, turning lights off and on, breaking windows, picking holes in the walls are examples of behaviors which were classified as disruptions. Conversations at a moderate noise level, amiable interaction or quiet meandering through the room or gazing out the window were not considered to be disruptive, since such activity was hardly noticeable in the midst of the greater holocaust.

The disruption could be either a single act or a sequence of acts. If a boy threw a pencil at another boy, he would be credited with one disruptive sequence. If the second boy returned the pencil through the air, he also would be credited with one disruptive sequence. If the first boy in a fit of anger began banging his book on his desk several times in rapid succession, he too would be credited with one disruptive sequence. If he stopped for some reason, and then a few minutes later became angry and started banging his book again, he would be credited with a separate disruptive sequence. Thus, a disruptive sequence may be defined as one or more acts in succession which noticeably distract a teacher or student from academic work, which would undoubtedly bring immediate reprimand in a normal classroom. During the B periods when the token exchange system was in effect, a disruptive act was defined as any act which characteristically had taken the teacher's or other students' attention away from academic subjects during the first A period.

Mrs. Linden had established a reward system as follows: each child was evaluated on three categories, his academic performance, his following the teacher's instructions and his kindness to other students. Under academic performance each child was rated from zero to one hundred. Under the other two categories the children were rated with either an X or a star. The score could increase or decrease during the day depending upon the boys' academic performance. Also the stars could become more or less completed during the day. At the end, each child whose score was high enough and whose stars were completed at the end of the day, received a candy bar. This by way of preliminary explanation. The following is rather typical of the interaction as it occurred toward the end of the first month, which was used as a baseline.

John has been sitting on a desk kicking his legs screeching in a high voice, staring at other boys and the two teachers, (score several disruptions). Mrs. Linden comes over and tries to drag him off the desk. She pulls at his legs until he is off and sits him down in a chair. (Although her intentions were quite different, she inadvertently rewarded his disruptive behavior by attending to him in this way.) Immediately he climbs back up on the desk (score another disruption). Mrs. Linden ignores this, rather she goes to the blackboard and completes the stars of the other three boys. She gives John an X. Ted, Ralph and Steve are sitting at a table working fairly well. Now John is in his seat, but is still not working. He is sitting with his chin resting on a book staring off into space. Now he is annoying everyone with very loud noises. John gets up, walks around the room. He now walks over to Ted and raps him on the head, thus interrupting Ted's studies. Ted ignores him; John now comes over to the one-way mirror and tries to look in. Mrs. Snyder now walks over to him, asks him to come back to the lesson, he runs away. She follows him, he runs past Steve, brushes him on the head (score several disruptions). John is making his verbal outcries again (score a disruption). The teachers try to ignore him. Now John sits down and begins to work. A minute has passed; now John stops work and starts yelling again. The teachers look up but that is all. Ted once again looks very tired, almost too tired to work.

He may need to have his medication (amphetamines) changed. John walks over to Steve, pretends to punch him. Steve flinches momentarily, stops work. Mrs. Snyder comes over, distracts John, sits down with him and starts him to work.

John seems to be working at last. He is still fidgeting; is making some progress. Mrs. Linden stops working with Ted, she is now gone to sit with Ralph to work with him. Ted immediately stops work, turns around, tries to see what Mrs. Linden is doing. He now comes back trying to look in Ralph's desk. Steve is pounding his desk with his pencil making a loud noise. Now Mrs. Snyder leaves John for Steve. With the teacher back at his side, Steve again settles down to his work. With the teacher gone, John ceases to work. He begins pounding his pencil into the table (disruption.) He puts his feet up on the desk (disruption). Ted continues to walk around the room (disruption) and Mrs. Linden walks to Ted's side then to his desk, sits down with him. He begins working (she rewards Ted's disruptive pattern). Ralph continues working fairly well without a teacher at his side. John is still acting up. He now goes over to Steve, shoves him. Steve tells him to get back to his seat, instead John goes to the window, now returns to bother Stanley. He roughs Steve up until the teacher comes over, at which point he starts running around the room (a disruption followed by an inadvertent reward for disruption followed by another disruption). She chases him (an inadvertent reward);

he runs back of her desk, pauses (a disruption); she follows him (reward); he is running again (disruption); she chases him around the perimeter of the room, this time unable to catch him (reward), she finally just gives up, walks away (reward). Mrs. Snyder has left Ted who now gets up from his lesson. Ted is at Mrs. Snyder's side wanting her to come back to help him. Mrs. Linden is now trying to help Ralph. Steve is at her side trying to get her to help him. Mrs. Snyder has John at his desk and is sitting beside him; he seems to be working. Steve gives up trying to get help from Mrs. Linden; he is back at his desk working, but not very hard. Ted has also returned to his desk and seems to be working without the teachers' attention. A minute passes. Now Ted is up walking around again. John is lying on top of his desk looking at the book that the teacher is holding in front of him. Ted now comes over and looks in the one-way mirror (disruption). Mrs. Snyder comes over and tells him to sit down (reward). Ted goes to his seat, starts working. Now, less than a minute later, he quits working, comes over, yells at John who looks up (disruption). Ted now moves over to the blackboard, pounds it loudly with the eraser. John is yelling in a loud voice at Ted to stop (disruption). Five minutes pass with the boys except Ted working. Ted has been pounding loudly at the borad during this time (disruption continues). Periodically his noises interrupted the others' working. Ted continues to pound on the board (disruption continues). John now stops working, a minute later, John and Ted are playing, they have a train game on the floor (disruption). The whole study activity has fallen apart now, no one seems to be working. Mrs. Linden now grabs Ted, brings him to his seat and starts working with him. Now she leaves for her desk. As she does this, Ted returns to the floor, he and John again start playing train (disruption). Steve and Ralph are working. Mrs. Linden takes Ted to his seat again, tries to get him to work, he doesn't want to (disruption). She goes over takes part of his star off the board. He runs around the room clapping his hands, kicking his feet. Mrs. Linden has John to his desk again. He is now settled down with his book with Mrs. Linden sitting beside him (thus the experimental period ends).

The structure of the exchanges in this class differ significantly from the structure of the exchanges in the older intermediate class. Both Mrs. Linden and Mrs. Snyder at least consistently rewarded academic work and progress most of the available time by sitting at the boys' desk working with them. Even John, the most disruptive of the four boys, could at almost any time be attracted to his seat to work at reading or at his work book as long as the teacher sat with him and attended his progress continuously. These boys evidently just loved their teachers' undivided attention.

Thus the disruptions, except perhaps a number of John's, were unlike those in the intermediate class; for the most part, were not part of a malicious pattern of teasing the teacher, of trying to get her upset. By and large, the boys engaged in disruptive behavior to get an invitation from the teacher to do seat work with her. The strategy worked almost, if not every time. The boys would gradually escalate their disruptions until one of the teachers responded. Once they had the teacher's attention, with few exceptions, the children would work until the teacher was distracted by the disruptions of another boy. When she would leave the first to go to the second boy, the first boy would usually stop studying within a minute or so and start on another round of disruptions. There were two exceptions to this pattern. As noted, John easily the most hyperaggressive of these boys, not infrequently engaged in malicious teasing. An example is the episode in which Mrs. Linden chased him around the room until she finally gave up. Also, Ralph who was relatively new in the classroom had not as yet learned to disrupt to get the teacher's attention. However, by the end of the baseline period, the situation had changed; he had learned well.

Again one is reminded of the pigeon pecking the button over and over again and the experimenter reciprocating most of the time with a food pellet. This situation, however, requires more complex model. In effect, the boys' disruptions earned them the opportunity to do academic work which the teacher would reward with her constant attention. Hence, the boys would disrupt until a teacher gave them the opportunity to do academic work for the reward of her presence, her attention, her help. This pattern was repeated over and over and over again. Every time the opportunity to work for a reward was terminated, the boys, three of them, at least, slowly escalated their disruptions until they had earned the opportunity to work for a reward again.

The data and Figure 3.d show that the boys who were in this primary class were working about 55% of the time at least toward the end of the baseline or A^1period. However, their disruptions were increasing from about 30 per every 40 minute experimental period toward the beginning of the month to about 75 toward the end. In other words, during this month, their disruptive behavior grew in frequency, typical of learning curve. When the token exchange was instituted in B^1, studying increased in a few days from baseline level of about 55% to about 95% of the available time. Disruptions decreased from about 75 to an average of 5 or 6 per experimental period. When the token exchange was taken out the second A^2 period, studying decreased a little, to about 85% and the disruptions increased to an average of 25 or 30 per experimental period. When the token exchange was put back in, in the second B^2 period, studying increased to an average of 96 to 97% of the available time, and disruptions decreased but this time to something less than 10 per experimental period. Hence the short term behavioral changes occurred as expected. By changing the structure of the classroom exchanges, the boys were enabled to study, to make academic progress almost all of the time. Instead of working for the teachers' undivided attention, the boys now worked for the red plastic disks which were passed out periodically with the teachers' approval. The tokens were enough of an incentive to work since they could be used to purchase a number of things including recess, swimming period, dessert and toys. Their disruptions no longer

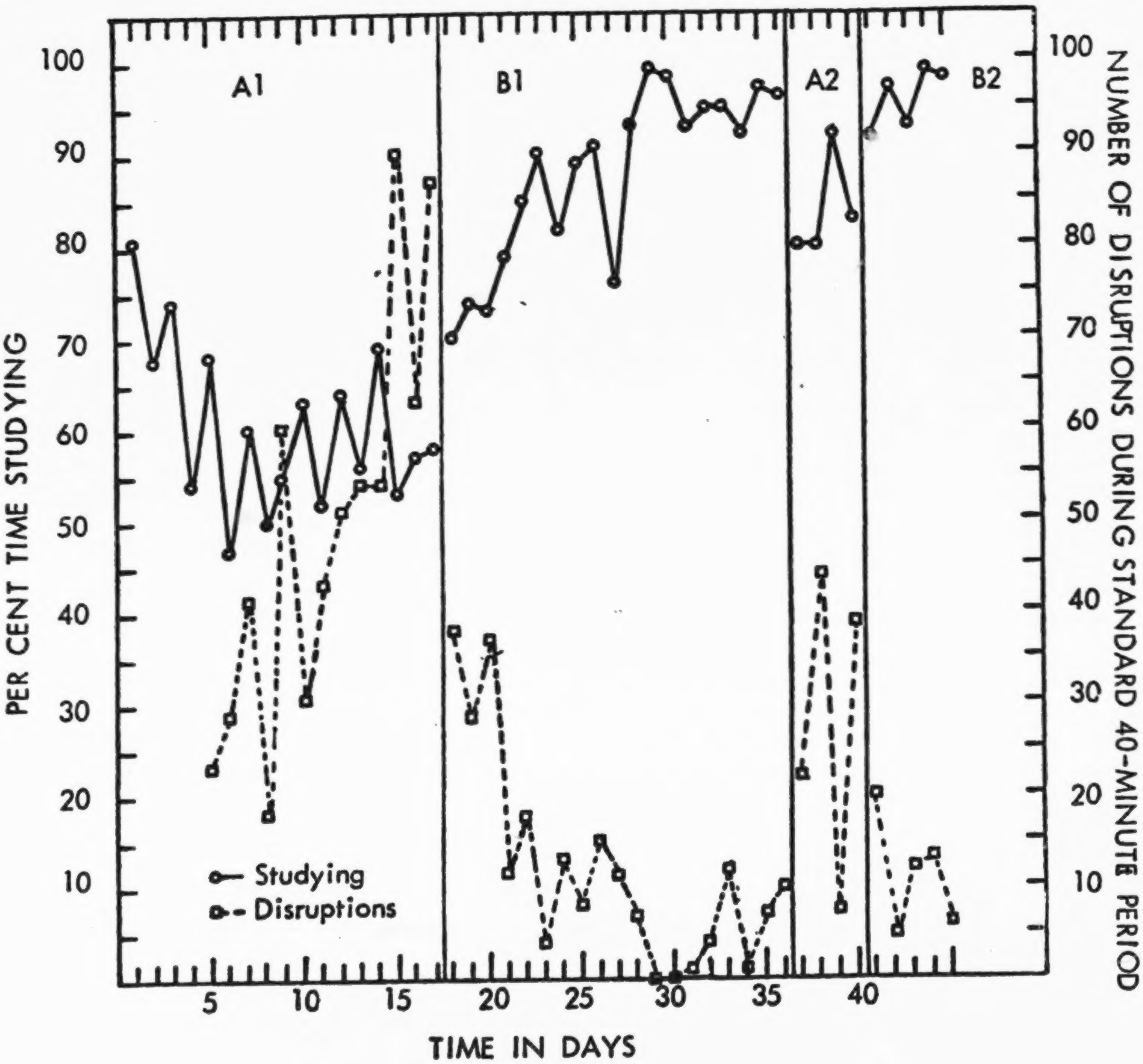

FIGURE 3d. The per cent time spent studying and the number of disruptions during a standard 40-minute period for 4 "hyperactive" first and second grade boys through time on a teacher's system (A1 and A2) and on a token exchange system (B1 and B2). The teacher rewarded studying with "stars" which were redeemed in candy at the end of the day, and she scolded disruptive behavior. In the B periods, tokens were continuously exchanged for study and could be traded for recess, swimming, privilege to buy ice cream at lunch, and, at the end of the day, toys. Disruptions were ignored, or if they could not be ignored, the child was timed out.

earned them anything, not even the opportunity to work for the teachers' attention. Hence with the pathogenic exchange terminated, they gradually got over their habitually disruptive pattern.

The Long Term Experience

By the end of the experiment in December, the boys were functioning well in the classroom, working most of the time with only a few serious disruptions each day. However, the teachers encountered some difficulty with the exchange as their emphasis now changed from maintaining order to obtaining academic productivity and learning. The teachers found it difficult to reciprocate for productivity on a semi-continuous schedule because it is difficult to keep track from moment to moment of what a child has actually accomplished. In other words, the boys found that they could sometimes earn enough tokens to buy what they wanted merely by behaving well and by feigning work. This is, of course, a pathogenic exchange and the teachers were alarmed to see it developing.

One solution to such a problem is a delayed exchange where the children receive tokens for correct work only at the end of a long assignment, when it is checked. However, most of them being hyperactive, these boys needed a semi-continuous exchange in order to avoid disrupting and to continue working. The teachers therefore attempted to work both types--a semi-continuous token exchange for good behavior and a delayed token exchange after working a long assignment for work correctly done. However, the boys found this dual exchange confusing--too many explanations were necessary. They had trouble distinguishing between tokens for behavior and tokens for work, hence the exchange began to lose its decisiveness. Furthermore, the boys found they could sometimes earn enough tokens to buy what they wanted merely by behaving throughout the day without accomplishing much in the way of academic work.

While it may seem complicated, the situation was corrected by structuring a semi-continuous *token* exchange to maintain good behavior and structuring a delayed *point* exchange for completing assignments correctly. Thus, before a lesson period began, the teacher would assign a boy a task where he could earn a certain number of points by completing the work satisfactorily. While the child was doing the task, the teacher or her assistant would periodically pass out tokens for working, and not disrupting. Then when the assignment was completed, the teacher would check the work and give points according to how much had been completed correctly. The tokens and points were equivalent in buying power but in general, it was impossible to earn as many tokens for behaving while doing an assigned task as points for doing the assigned task correctly.

For example, if a boy's behavior were satisfactory during the reading period, he would be given tokens periodically, perhaps as many as seven. When the ten assigned pages were completed and the questions on the reading answered, the teacher wouldgive him perhaps ten points. These ten points when added to the seven tokens would bring the total to seventeen. Another child may have behaved well enough but completed fewer questions correctly and thus earned 7 tokens plus 3 points for a total of 10. Another child may have completed his assignment correctly, but disrupted several times in the process, thus earning 10 points, but only two tokens for a total of twelve.

Thus, the exchange was structured to enable the boys who worked well and behaved well to "out-score" the other boys. This was enough to settle the boys down to an almost steady work pattern. Even so, other problems developed.

The teachers noticed after a time that too many tokens were being lost or stolen. They decided that it was because they were allowing tokens to accumulate too long in the boys' pockets or in their desks. After some consultation, the teachers began counting and recording tokens three or four times a day. It worked; the boys were enabled to hold on to their earnings. However, there were additional unanticipated benefits from making a visual record of the number of tokens and points earned. They seemed to enjoy the graphic growth of their barchart or, as they sometimes refer to it, . their bank account. Also, they began to relate their earnings to those of others in the class. For both of these reasons then, the record provided additional incentive to work.

Also there were some problems with backup reinforcers which could be purchased with the tokens. The children worked best for big, long term rewards. For example, for their Thursday afternoon swim, for periodic field trips, for parties (on birthdays or other occasions), and for games and toys which they could purchase (like model airplanes, G. I. Joe kits, etc.). However, because they were hyperactive, most of the boys had trouble sustaining any extended work effort for one of the big delayed purchases unless they had the opportunity to buy small inexpensive consumables along the way. Hence, over time, the teachers learned to make smaller purchases available; sweets (candies, cookies, soda) classroom games (playing trains, playing space, playing blocks,etc.)

special privileges (to look out of the window at a fire engine, a storm, to be able to count tokens or points or to be able to carry the ball to recess or gym), and free periods for art or reading. With these minor adjustments, the boys worked the token exchange well all year.

After the initial experiment was completed in December, two additional boys were added to the class, one at a time. Although we anticipated some difficulties, no major problems developed specifically because of the introduction of the new boys. Each learned the token exchange and within a few days was working it.

However, one of the new boys was not hyperactive but terribly obese, and if anything, hypoactive. He would sit for hours just dawdling away his time, accomplishing little. He apparently was placed in our experimental class in the hope that the token exchange would motivate him to work. It did, but in retrospect, he might have done much better had we worked with his parents to structure an exchange at home where he earned according to classroom accomplishments. (As we shall see, with some of the intermediate boys, exchanges structured in the home can be very powerful in their effects.)

Mrs. Linden, the teacher, made a decision in early December when the token exchange finally enabled the boys to settle down to work, that she would have them re-do much of the first or second grade work when they had covered earlier. This is because most of the boys had done such a poor job of learning the first time through. Even so, the boys as a group made substantial progress in their academic subjects by the end of the year as may be noted in Table 3.3 (measured by California Achievement Test, Primary Level). The median is 1.0 years in reading and 1.4 years in arithmetic.

TABLE 3.3

GRADE LEVEL MEASURES AND CHANGES--PRIMARY CLASS

Date Enrolled in Tuder School	Child	Subject	Grade Level		
			At Enrollment	Summer, 1968	Change
September, 1967	John	Reading	Knew two letters of alphabet	2.3	1.3
		Math	Could count to 10	2.9	1.9
September, 1967	Ralph	Reading	1.9	2.9	1.0
		Math	1.8	3.7	1.9
November, 1967	Bud	Reading	1.5	2.4	.9
		Math	1.7	3.1	1.4
September, 1967	Steve*	Reading	1.1	2.0	.9
		Math	1.2	2.3	1.1
January, 1968	Randy	Reading	1.4	3.0	1.6
		Math	1.5	1.5	.0
September, 1967	Ted	Reading	Beginning kinder-	1.5**	
		Math	garten level	2.0**	
Median Change in Reading.					1.0
Median Change in Math.					1.4

*In June, 1966, Steve scored 1.0 in Reading and 1.1 in math.

**Teacher's evaluation based on texts used in class.

Ted, the youngest boy in the class could not be tested with these particular achievement tests. However, he mastered the reading readiness material that he should have learned in the previous year in kindergarten, and he learned to read. At least he finished the first set of primers which would put him at the 1.5 grade level in reading. In arithmetic, he progressed nicely; he was working at the beginning second grade (2.0) level texts when the year ended.

Experiment III

The four boys in the intermediate class were 10 to 12 years of age at the beginning of the school year, normally they would have been in the 4th or 5th grades. As with the primary class, we allowed the teacher to run the class as she saw fit for the first month to obtain a baseline. The results were similar to those which obtained in the first experiment: these boys were malicious teases. The classroom was simply wild. The following is a rather typical 30-minute experiment. The account was dictated by the second author as he watched from behind a one-way mirror. There were more disruptive, more aggressive days and there were days with fewer problems. This day was chosen because it is rather typical. To help the reader get a feel for the exchanges that were going on, an analysis is interspersed in parentheses. In this analysis, we have continued to code disruptions, and add the code, negative behavior. Both of these categories are special cases of aggression directed mostly toward the teacher, used here primarily because they are more descriptive of what was going on.

Miss Tall announces they will be reading for a half hour (an exchange negotiation), but this doesn't produce any response (they are refusing to cooperate in the proposed exchange). The students still sit there, three of them in the classroom and Rudy in the cloakroom. Dave throws his eraser (score a disruption) at Dan who is bothering him (score a disruption for Dan too). Dave and Dan pull faces at one another (score disruptions for Dave and Dan). Miss Tall comes and asks Dan to work (an inadvertent reward to Dan--she gave him attention while he was acting up); he says "Get away from me--get away from me", and refuses to let her talk. He keeps this up until she finally leaves. (Dan reciprocates by punishing her attempts to get him to work, and she inadvertently reinforces this negative behavior until she leaves.) He jumps up and throws his book (score two disruptions). Now he has his book and seems to be looking for the place where he stopped yesterday. (Note the teacher ignored the last disruptions and Dan stopped disrupting! He is now working.) Dave is making strange noises with paper over his mouth (score a disruption), trying to get Miss Tall's attention, which he does (score one inadvertent reward for disruption). Ned just sits in the corner, thumb in mouth, and watches. He seems to be very bored by the whole classroom. Now he slyly shoots Dave with a rubber band, (score a disruption).

Dave and Ned now start arguing about whether Ned shot Dave with a rubber band (score three disruptions). Now Dan quits studying and gets up, stretching, walking around the room, talking to other people (score several disruptions). Dan and Dave huddle together talking in inaudible tones (score two disruptions). Ned talks to Miss Tall and claims he didn't shoot that rubber band (her attention is an inadvertent reward for Ned's earlier disruption). Dan is crushing something on the floor (score one disruption). Ned is yelling out the window (score one disruption).

It's ten minutes now since Miss Tall asked for the beginning of the reading activity. Almost no work has been done in this period. There are only three boys in the classroom. Rudy is still in the cloakroom but we don't know what he is doing.

Dan is sitting on the bookshelf, looking out of the window (score one disruption). Miss Tall comes over and gives him a book and asks him to start working on it. (She thinks she's trying to get him to work, but inadvertently has just rewarded his last disruption.) At this point, he throws a wild tantrum (score a disruption), runs around and back to his desk and starts kicking (score several disruptions). Now he runs into Miss Hall, Miss Tall's assistant, who tries to encourage him to begin the activity (her attention inadvertently rewards his disruptive behavior). He just turns his face to the wall and gazes at the wall until she leaves. (He times her out, extinguishes her attempt to get him to work but all during this time, she is rewarding his negative behavior with her undivided attention.) He now looks around and sees that she's gone, and relaxes.

Miss Tall is now sitting with Dave, trying to get him to work. He doesn't seem to want to work. (Her attention is reinforcing his negative behavior.) He puts his head on the desk, times her out. She continues to urge him to study, finally gets up with the book and leaves. He raises his head. (Until she left, her attention continued to reward his negative behavior).

Dan now seems to be working with no attention given by the teachers (failure to reward with approval desirable study behavior). Dave also begins to work. This is some twelve minutes after the activity should have started.

Miss Hall goes back to see Rudy in the cloakroom. (By doing so, she inadvertently rewards Rudy for his negative behavior.) Miss Tall sits down with Dave again. He now seems to be ready to accept her help. (She did it correctly. She rewarded him with her attention for his studying.)

Dan is still working with no attention from the teachers, and Ned is pressed over in the chair, holding his arms over his head. He now seems to be doing some work. He is writing in his work book. It looks good; he seems to have all the coordination that one needs to write, but this is the first time that he has shown it. Ned now closes the work book and reaches for another. Now he puts them both on his desk, aligns them carefully, sits and stares at them. (The teachers failed to reinforce Ned's study behavior and he was therefore unable to maintain it.)

Dan looks over his shoulder and then starts pretending he's a trumpet player (score one disruption, which follows period of study with no reward). Miss Tall says, "Dan!" (Score one inadvertent reward for disruptive behavior.) He looks at her, makes some strange faces with his eyebrows (score another disruption), and goes back to work. (Since Miss Tall did not reward that last disruption with negative attention, the sequence is terminated).

Miss Hall is still back with Rudy in the cloakroom. (She's continuing to reinforce his negative behavior.)

Dan puts his book away and starts wandering around the class (score one disruption). He stops and looks out the window. This walking around has disturbed Dave and he quits working also. Miss Tall ceases to try to work with Dave; instead she scolds Dan for his disruption (score one inadvertent reward for disruption).

Ned has now put his books away and he is looking out the window (score one disruption after an attempt to study without reward). Dan is still wandering around (score some disruptions). Miss Tall says, "Dan, take your seat". (Score another inadvertent reward for disruptive behavior). He says, "I'm trying to find another book", and continues to walk around (score one disruption). Dan walks into the cloakroom (score a disruption) and Miss Tall follows him (score an inadvertent reward for attending a disruption).

Dave quit working. Dan comes out of the cloakroom and begins combing his hair and making some strange gestures (score several disruptions for Dan and several rewards from other kids). Now he goes back to his seat and starts yelling at the teachers. (Score a disruption).

Now Dave combs his hair, too. He makes himself a Beetle hairdo (a disruption which is ignored by the teacher, so he stops). Miss Tall tries to get Dan to work (an attempt to negotiate an exchange) and he yells, "Get out of here. I know what to do," and pushes her away (score two disruptions). She is trying to find the place for him to start working in a book (by continuing to give him attention, she inadvertently rewards his disruption) and he attempts to grab the book from her (score a disruption). Dan then says, "Leave me alone," and shakes his head around and puts it down on her desk. Miss Tall continues for a moment (score inadvertent reward for his previous disruptions), and then leaves with her back turned, at which point he smiles. Now Dan goes back to work. (Note he enjoys these negative encounters and when he is not being reinforced for his disruptive behavior, he often starts working.)

Miss Tall now sits with Dave. Now he is pounding his pencil on the table (score a disruption). Miss Tall just asked him to do something that he apparently didn't think he could do. (The disruption followed an exchange negotiation.)

Dan is not studying either. Now he is whistling (score a disruption), and Ned is imitating him (score another disruption). Miss Hall comes out of the cloakroom and stands there and watches the children (score an inadvertent reward for disruption). Ned has once again taken his seat and is writing something on a piece of paper. He is drawing designs (score failure to reinforce study behavior, or an approximation thereof.)

Rudy comes out smiling, telling Miss Tall that he's finished the book. He seems to be very proud of himself (exchange negotiation). She smiles back and seems to be proud of him (reward for exchange negotiation). He wants to take the book home. Rudy returns to the cloakroom.

Dan is still working; Dave is now talking to Miss Tall; and Ned is still drawing designs on his paper. (Neither Dan nor Ned is rewarded for his study behavior). Dan now puts his book down and starts walking around the room (score a disruption following study that is not rewarded). Miss Tall tells him he can do anything he wants but he has to sit in his seat (score an inadvertent reward for disruption). He stomps his foot on the floor (score a disruption) and returns to his seat, starts talking to Dave, who is no longer working (score two disruptions).

Dan says, "Can me and Dave draw?" (Miss Tall ignores him and thus fails to reward an approximation to study behavior. This is the reading period.) Dan is pounding on the closet (score a disruption) and Dave says, "Shut up, Dan, or I'll come over and pound you one." (Score another disruption). Dan returns to his seat with a piece of colored paper, which he's probably going to draw on or cut out something. (Because he was not rewarded, he has terminated his disruptive sequence.)

Miss Tall is trying to get Dave to work (an exchange negotiation) but he shakes his head and says, "No". She stands there for a moment looking at him, hesitating, and then leaves. (Her attention rewarded his negative behavior.)

Ned now has a piece of paper in front of him, drawing designs. This is more than he has ever done before although it's not really the scheduled study activity. (Note the teachers ignore him, fail to reward his approximation to study activity.)

Dave now starts working again. Now he stops. His attention was caught by Dan's walking around the room (score a disruption for Dan). Dave is now talking with Dennis (score two disruptions). Ned also quits working, gets up and looks out the window (score a disruption, again after study is not rewarded).

In analyzing the above as well as the other episodes which occurred during that first month, the following generalizations appear to be indicated.

1) As a rule, with very few exceptions, the teachers ignored the boys and thus failed to give them any attention whatsoever when they were engaged in academic work. This was unfortunate because the teachers' attention appeared to be a reward for these boys. In fact, they would try studying over and over again, typically with no tangible

results. Only after they would in effect give up on getting the teacher's attention by studying did they return to their disruptive patterns which almost always earned the teachers' attention.

2) The boys apparently enjoyed putting the teachers on, playing the game "Let's Tease the Teacher". This was not always obvious, but in other sessions not recorded here, they "tipped their hand" by, not infrequently, smiling behind the teacher's back after they had put her through a particularly harrassing series. Also they would disrupt or be negative as long as the teacher reciprocated with her disturbed attention. Only when she gave up did they stop. Hence, it seems fair to draw the parallel between their interaction and that of the pigeon and the experimenter in the learning experiments. Recall the half-starved pigeon pecking a button and the experimenter reciprocating by dropping a food pellet into the feeding tray. The sequence would be repeated over and over again--pecking, feeding, pecking, feeding--until either the pigeon or the experimenter tired of the exchange and thus terminated it. In this instance, the boys seemed to have an insatiable appetite for teasing, for upsetting the teacher. Hence, the half-starved boy would engage in disruptive behavior, the teacher would respond by being upset, by thinking she was punishing them and thus inhibiting their behavior, but in reality rewarding them and thus reinforcing their behavior. The sequence--disruption, negative attention, disruption, negative attention--would continue until the teacher gave up and would walk away.

3) Furthermore, the boys appeared to work this inadvertently structured exchange whenever the conditions were appropriate. In

general, the teacher would become upset under two circumstances: a) after the boys had been studying for a time, but then stopped to engage in disruptive behavior. Almost invariably such a sequence would upset the teacher, instigate her to put an end to the disruptions. Usually she would try several times before giving up. However, once she did become disgusted, she would walk away and the exchange would be off. The boys would sometimes probe with further disruptions but would give up once they saw the teacher would no longer respond. b) Whenever the teacher would approach them to get them to work on their studies, the boys learned that they could always get the upset reaction by engaging in negative disruptive behavior. This they did with very few exceptions. Furthermore, they would continue to work this inadvertent exchange until the teacher gave up.

In both circumstances, the termination of the exchange by the teacher typically resulted in the boys going back to their studies.

In looking back on the protocols which described these sequences in detail, it seems as though the boys were purposely setting up the first condition by doing some studying so that they could again work this pathogenic exchange which the teacher had inadvertently structured. These exchanges were pathogenic because as the boys worked them over and over again at every opportunity, their disruptive, negative response patterns were becoming more and more developed, more and more habitual via implicit learning. Thus, we must come to the uncomfortable conclusion that these teachers were running the classroom in a way that exacerbated rather than ameliorated the boys' problems.

The data in our experiment are given in Figure 4e. Shown is the percent of time the boys spent studying and the number of

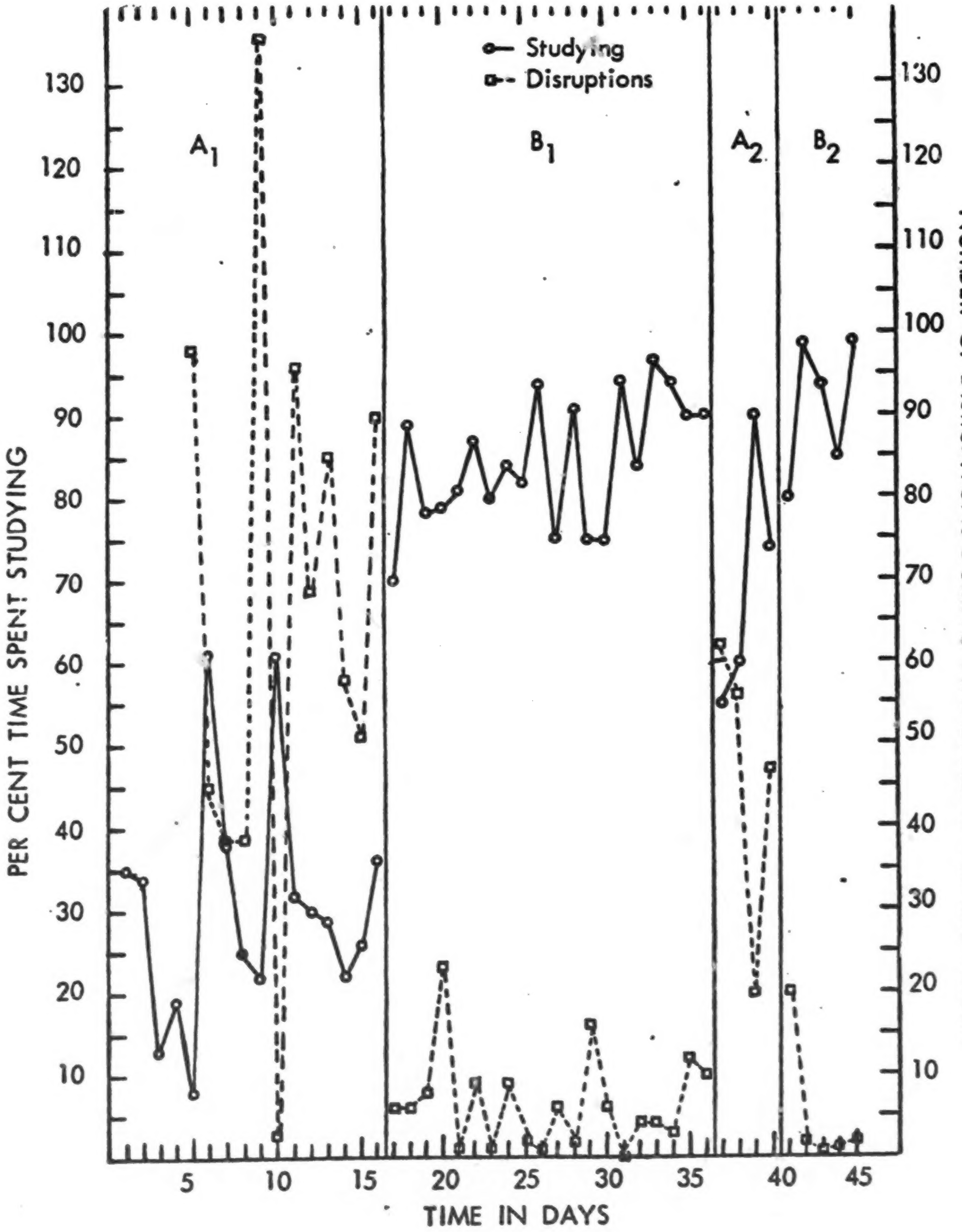

FIGURE 3e. The per cent time spent studying and the number of disruptions during a standard 30-minute period for 4 "hyperactive" fourth and fifth grade boys, through time, on a teacher's system (A_1 and A_2) and on a token exchange system (B_1 and B_2). The teacher rewarded studying with help and attention some of the time, and mildly, though consistently, "punished" or scolded the worst forms of disruptive behavior. In the B-periods, tokens were continuously exchanged for study and could be traded for recess, swimming, privilege to buy ice cream at lunch, and, at the end of each day, appropriate toys. Disruptions were ignored, or if they could not be ignored, the disruptive child was "timed out" into a small room adjacent to the classroom.

disruptions during the reading period, which was experienced as the most difficult, the most interesting period of the day and therefore the most disruptive.

In this experiment, the teacher's system was in effect during the A periods. Recall she infrequently rewarded studying with help and attention, but quite consistently scolded and otherwise "tried to stop" disruptive types of behavior. In the B periods when the token exchange was in effect, tokens were continuously exchanged for study and could b e traded for recess, swimming, the privilege to buy ice cream at lunch, and at the end of the day, toys, etc. When the token exchange was in effect, disruptions were ignored, or if they could not be ignored, the disruptive boy was "timed out" into a small cloakroom adjacent to the classroom.

During the A^1 period, there was considerable variability in the boys' responses. However, by the 15th, 16th, and 17th days, the boys had settled down to a fairly predictable pattern. They were studying about 28% of the time and averaging 66 disruptions for the half hour experimental period.

When the token exchange was put into effect in B^1, a remarkable change occurred. There was a substantial increase in studying and a substantial decrease in the rate of disruptions. On days 21, 22 and 23, the boys spent 83% of their time studying while disrupting only 11 times. Note that this remarkable change occurred on the first few days, then it stabilized.

To check on our causal assumptions and to capitalize on the contrast effect, on day 37, we took the token exchange out. We did this simply by taking the tokens away. Although subjectively "things seemed to fall apart", the data indicate that much of the previous improvement was maintained. The main problem was the teachers. Without the crutch of the token exchange they tended to regress to their old habits of attending to disruptive behavior and failing to reward academic work with approval. Nevertheless in this short time the boys had changed. They had become somewhat socialized. In this second A period, the boys averaged 47 disruptions during the half hour experimental period as compared to 66 at the end of period A^1. Similarly, in A^2, the boys studied an average of 70% as compared to 28% during A^1.

The token exchange was reinstituted on day 41. The boys responded almost immediately. In general, the disruptions were down to something less than 10, but they studied somewhere between 90 and 95% of the available time. Thus, in B^2, they did slightly better than they did in B1. It again is as though the contrast of going back to the old traditional system made them appreciate the token exchange even more than they had the first time. As best we could gauge their reactions, the teachers felt the same way.

The Long Term Experience

By the time the experiment ended in December, the boys were doing well in classroom. Like the primary class, they seemed to be working most of the time with only a few serious disruptions. However, with the introduction of two new boys, each at different times during mid-December and then January, and with the change of emphasis from maintaining order to obtaining academic productivity and learning, a number of major problems were encountered. While each of the new boys behaved well for the first two or three days while they were learning the token exchange, each then began testing "the system", trying to subvert it. Unfortunately their disrupting, subverting patterns were contagious; the other boys would join in. Also these teachers had the same problems as did the teachers of the primary class trying to manage a continuous exchange for academic achievement. Thus, in addition to the periodic disruptions, there was some feigning of work.

Out of this turmoil, a very sick, cyclical system developed where the boys would disrupt for a period causing great turmoil, then as a group, would settle down to work, or at least to feign work. Then they would agitate again, then settle down again, and so on. When the calm work periods arrived, the teachers were so grateful that they overpaid the boys. Thus during their working periods between the disruptions and agitations, the boys were able to "earn" enough tokens to make the more desirable purchases.

In an attempt to ameliorate this situation, the following exchange was structured: reasoning that these were older, better socialized boys, it was decided to try a delayed exchange where points were given at the end of each work period. For example, 10 points might be allotted for behavior during each work period, and up to 10 points for work correctly done. However, we were wrong, they were not that well socialized. Being hyperactive, the boys were simply unable to sustain their interest in academic work without periodic reinforcement. Therefore, periodic token exchange was reintroduced during the working period. Hence, the teachers ended up with a system similar to that which evolved in the primary class, a periodic token exchange for good behavior during working periods, and a delayed point exchange for work correctly done. This new structure broke the cyclical pattern. While the boys continued to disrupt at a rate substantially higher than that found in a normal classroom, these disruptions were scattered throughout the day. Even so, the situation was far from ideal and the boys were still somewhat lackadaisical about their studies.

Consequently, several attempts were made to increase the power of the classroom exchanges by increasing the value of those things which could be purchased with tokens. The most successful innovation along this line was a money allowance. Each boy was allowed to exchange tokens for a maximum of 20¢ a day or one dollar a week. Although this allowance seems small, the boys appreciated the opportunity to earn it and their work did pick up somewhat. Even so, it became obvious that the power of exchange had to be increased further. We essentially faced two choices: spend much more for backup reinforcers at school or have the parents structure exchanges at home. While we could have enriched the store at school, it seemed more probable that, with the cooperation of the parents, we could structure more meaningful exchanges in the home.

The parents, genuinely worried about their boys, were most cooperative. Hence with them we were able to work out several "cookbook" exchanges which were relatively simple. For John, the most troublesome of all the boys, an exchange was structured so that his performance at school each day determined his privileges at home that evening (that is, whether or not he could watch TV, listen to his record player, visit with friends, etc.) In addition his weekend privileges were in exchange for his performance during the week. A second boy, Dave , whose study habits were most unstable, just lived to work part time in his father's print shop. Hence, an exchange was structured where the privilege of working part time had to be earned. Thus the better Dave did in school, as verified daily by notes to the father from the teacher, the more he could work in the print shop. For other less troublesome boys, a less powerful, more delayed exchange was structured by behaving well in school and doing their studies, they could earn special activity with their father each weekend. For example, the father might take the boy for a motorcycle ride, fishing, camping, etc., where the value of the activity was proportional to the boy's verified performance in school.

The combination of the more continuous token and point exchanges at school and the delayed exchanges at home was enough to transform the situation. The boys settled down to work and by April they could have been mistaken for an honors class. Their behavior was exemplary and they worked continuously morning and afternoon. In fact, some of the boys began working right through recess, they were so motivated.

It was about this time that the effects of the long term conditioning processes began to be evident. The boys decided among themselves that they wanted to be the very best class in school. Thus, when they attended assemblies, went on outings, or participated in gym, they were the very models of behavior, at least when judged against their past behavior. This pattern was reinforced naturally when the principal, other teachers and other children began to notice what was happening. Every time they participated in public, they began receiving a rash of compliments from surprised outsiders.

Also the parents began to report that the boys were studying at home. A number of the boys began to develop personal libraries. The parents began finding their boys reading in their rooms at night before going to sleep. The parents all noticed a big change in attitudes toward school. As usually the case with children who are on meaningful exchanges at school, having to stay home because of illness became somewhat traumatic to these boys. Not infrequently, they would show up at school ill, having persuaded their parents to let them attend school that day, anyway.

Also, the behavior changed at home. Parents often reported that the boys started getting along better with siblings and neighbor children. Some of this is because the boys stop picking so many fights. In other instances, however, it was because the boys were finally able to escape the "dum dum" label. For example, Rudy, who had been plagued by the "dum dum" label talked so ecstatically about his school and evidenced so much academic progress that the children who had previously tormented began openly envying him.

At the beginning of the year when this intermediate class settled down so quickly in our initial experiment with them, we dared hope that they would make remarkable academic progress. However, as noted, with the introduction of the new boys, it took us until April to settle the class down into a routine of serious study. Hence, our hopes de-escalated. Even so, these boys did very well as may be noted in Table 3.4. Their median increase in reading was 1.75 levels; (four were measured on the California Achievement Test, Upper Primary, two were tested on the Iowa Test of Basic Skills) in arithmetic, 1.35 levels and overall 1.55 levels. While this substantial improvement indicates these boys do have the chance of catching up with their peers academically, they still have their problems. Their early classroom experience was so bad that much of it needs to be done over again. While they can now spell 3rd, 4th and 5th grade words, for example, they all too often miss 1st and 2nd grade words. In other words, they have curious deficiencies which require remedial work. While this remedial work will slow them down some, many of the boys should reach the normal level next year.

While the above is a general picture of what happens to the boys in this intermediate class, many interesting details are missing. To compensate, at least partially, we will now turn to two case studies to give a picture of what happened to two of the more interesting boys, Dave Regia and John Munsen.

A Case Study: Dave Regia

At Tudor School, Dave Regia had a bad reputation among pupils and among teachers. To other boys, he was "retarded", "stupid", and "a bully". To the teachers, he was "disrespectful", "a bad actor", "an anxious, ineffectual student". Dave began to earn that reputation during his primary years at a parochial school; he had been aggressive, disruptive, and worse in some respects, uncooperative, unwilling to learn. For example, he would simply refuse to work to improve his

TABLE 3.4

GRADE LEVEL MEASURES AND CHANGES--INTERMEDIATE CLASS

Date Enrolled in Tudor School	Child	Subject	Grade Level		
			At Enrollment	Summer, 1968	Change
September, 1967	Rudy	Reading	2.3	3.1	.8
		Math	2.1	3.2	1.1
February, 1967	Tony	Reading	3.8	4.5	1.4*
		Math	3.6	4.5	1.8*
September, 1967	Dan	Reading	5.6	6.8	1.2
		Math	4.3	4.5	.2
December, 1967	John	Reading	4.8	6.5	1.7
		Math	4.3	5.8	1.5
September, 1967	Dave	Reading	2.4	3.5	1.1
		Math	3.8	5.0	1.2
September, 1967	Ned	Reading	1.5	2.8	1.3
		Math	2.0	3.5	1.5
Median Change in Reading.					1.25
Median Change in Math					1.35

*Tony was in the program less than 1/2 year--median change is extrapolation from gains made in four months.

meager reading skills. He was diagnosed as having perceptual problems and the school could find nothing which would motivate him to work to ameliorate these. Instead, Dave became increasingly uncooperative, disruptive, aggressive, until he was finally referred to his community's special education program.

Dave was in a special education class for a year before he was assigned to our intermediate class. In that year, he continued to refuse to do his lessons, to be disruptive in class and to be extremely aggressive toward the other pupils. According to one staff member, the classroom battles between Dave and the teacher finally became so frequent that none of the other children were able to work. Because of Dave, the class was in general chaos. He was about to be expelled from the special class when the agreement was negotiated with our laboratories. Because we had asked for the toughest children available, Dave was kept on for assignment to us.

From the beginning, Dave continued to display his disruptive, aggressive talents. He banged his pencil on the desk, threw erasers across the room, he kicked and pounded the walls, damaged the floors and the desks; in addition, he fought with the other boys, sometimes in running battles that lasted for days. The teacher would try to separate the boys and end the fight, but later, Dave would be back at it again. He simply refused to stop; he just seemed unable to inhibit himself once he became involved in a fight with another boy..

Dave was belligerent with peers; he was continually challenging other boys, "show me", "make me", "fight me", "come on". He would run over to them and tauntingly stand there with his fists ready, his head cocked back, his eyes blinking furiously. He would fight with the other boys [illegible] who had the most soldiers or who had the most Lincoln logs. He manipulated card games and ball games unfairly to win and he would fight with the other boys about that. He was dishonest in a fight and in any mediating session with the teacher; he lied about the facts, et cetera.

However, malicious fighting was not his only problem. Dave was a tenuous student at best, characterized by his teacher in the following way:

> "To Dave, the classroom was a place of anxious trial, of almost certain failure. As he began a day, he would start to make small errors. His small errors would increase his anxiety; his increased anxiety would lead to larger errors; and so on all day long. Consequently, he did not have the confidence to be independent. He showed little self-direction; little initiative. He was so unsure of himself he hesitated to begin his work and once started, his anxiety quickly increased to the point where he would never finish. Thus, Dave was unable to work for more than 15 or 20 minutes in any one assignment. Some days he refused to do any assignments at all. These difficulties were compounded because Dave was unable to tolerate assistance from the teacher for more than a few minutes at a time. This was perhaps because he felt that help from a teacher was a living demonstration that he was unable to do the work himself.
>
> "Thus, Dave was very conscious about his failures in school. He was most ashamed about the discrepancy between

his age and the level of work he was doing, baby work as he characterized it. As a result perhaps he would go into depressive states where he would sit, drum on his desk top, pick his arm, fidget, look as if he might burst into tears any minute. Also, he had a facial tick which became very severe during these periods; his eyes would blink 10 to 20 times faster than normal. In such a state he seemed unable to initiate any satisfying activity. In fact, during these periods, nothing that anybody could do satisfied him. Rather he wallowed in misery, complaining that he felt sick or that he was tired. Also, he would be instigated to fight by the least little adversity in the classroom.

"In general, he had a poor self image. He would often pull his hat over his face and/or he would try to hide it in other ways. Several times for example he made masks and placed them over his head. Also, he would lie on the floor, with his face down, hidden in his hands. All this was rather pathetic because Dave was a rather handsome boy, particularly when in a pleasant mood."

When the token exchange was first introduced in early October, Dave began to improve; as may be noted in Figure 3f, his studying during the half-hour reading period increased from about 17% to something between 80 and 95%. His disruptions decreased from something between 8 and 30 per half hour to something between 0 and 6 for that period. The teachers were very encouraged by his progress.

However, with the introduction of the new disruptive boys after the Christmas recess, Dave began to regress. His studying became very erratic. One day he would be a model student, the next he would refuse to work. Altogether, his behavior was much better than during the first few weeks of school but not approaching what we had seen was his potential.

Various explanations were offered. The clinical psychologist on the staff felt that his medication was inappropriate, that Dave should be taken off stimulants and given tranquillizers. The principal felt that the teachers were being too lenient with Dave. The experimenter felt that the classroom reinforcers were not powerful enough.

Yet when Dave was taken off stimulants and given tranquillizers, there was no noticeable effect on his behavior. When the teachers became more demanding, used a more stern approach, he only became worse. Furthermore, the experimenter was simply unable to locate any back-up reinforcers which would stabilize Dave's erratic behavior. All of these probings took two and a half months and all ended in failure, relatively speaking. Dave continued to perform at perhaps 50% of his potential.

Finally, one day in late March, the experimenter had a talk with Dave. He simply asked him what was the matter. Dave replied easily with what turned out to be the correct diagnosis. Dave's father had opened a small printing shop and since January, had been paying Dave, who was mechanically talented, $3.00 a day to work for him after school. Although technically detailed, the job required no reading and no formal mathematics. He was making what he considered to be very good money without knowing how to read, without knowing much in the way of arithmetic, et cetera. In other words, he concluded to himself that he could earn what he considered to be a good living without completing school. Furthermore, his grandfather, who was a successful printer, had not finished grade school. Also, his father had dropped out of high school. Both were earning a good living; "Why should I be different?", Dave thought.

Once the experimenter discovered the problem, he had a conference with Dave's parents. They were very concerned about his scholastic failures and therefore they were very eager to cooperate. When told about Dave's conclusion about "not needing to read to work in a print shop", the father immediately suggested that Dave would not be allowed to work in the shop unless he behaved well and made satisfactory progress at school. So arrangements were made for the teacher to send a note home each day, evaluating Dave's performance. In addition, a very imaginative requirement was introduced in the print shop itself. Dave had to be able to read each print job to the father's satisfaction before he could work on it. To be satisfactory to his father, Dave had to increase his reading fluency from week to week.

Once these exchanges were structured, a new zest, a new interest was evident in Dave's work. He often completed his assigned lessons by noon and spent many recesses and afternoons in free reading or performing mechanical experiments. As the data in Figure 3f reveal, from mid-April until June, Dave worked from 90 to 100% of the time during the 30-minute reading period, and during that period he stopped disrupting entirely. This was characteristic of his performance during the other parts of the day.

At the year's end, his teacher gave the following account of his progress:

Reading

Before: "When he entered the classroom at the beginning of the year, Dave was reading at what I judge to be the middle first grade level. His vocabulary recognition was sporadic, he blocked with a number of words, and he was not able to utilize phonics in sounding out new or difficult words. Also, he was subject to reversals, reading "was" as "saw", et cetera. In addition, his anxiety evidently did not allow him to repeat some words so he repeated the idea instead, substituting pony for horse, fruit for apple, et cetera. Also he missed small prepositions and conjunctions. Dave's reading mechanics were poor: he did not read smoothly but stopped and started in a very jerky manner. Also he had difficulty keeping on a sentence line of a page; he skipped around constantly. While he read, Dave would become very nervous, drum on the table, shift his feet, or go into rhythmic patterns with his body. He disliked reading, in fact, he seemed to hate it. While reading, he was constantly fighting depression. Dave quite obviously wanted to read at a higher level and was very frustrated because he realized that he could not. At best, he could read at a lower elementary grade textbook."

After: "The first time I realized the big dramatic change in his reading was when he went with Mr. Buckholdt during which time he was rewarded for his reading, not only by the presence of a masculine figure but also with tokens, enthusiasm, et cetera. This experience gradually changed his basic attitude toward reading and the change carried over into the classroom. Toward the end of February, I realized his reading was really up to capacity for his phonetic skills so we began to work with them. His reading continued to improve through March. Beginning in April when I started sending notes home to his father, Dave's progress accelerated. He is now able to read independently in middle fourth grade level books. For example, he is able to read well enough in a fourth grade geography book so that he is able to answer the questions independently.

"In the fall I was told by the staff psychologist that because of brain damage, Dave would be unable to learn to read past the middle elementary levels, that at best he might be taught to read enough so that he could just get by in his adult years. However, that prognosis seems much too pessimistic in the light of his progress this year. Even his perceptual problems are no longer evident in the classroom. Now when he reads "was" for "saw" he quickly corrects himself. The improvement makes one think that perhaps his veversal problem was just a habit. When Dave is rewarded consistently for not making these mistakes, he himself is able to handle the problem.

"Dave is now able to read a page from a book without the aid of a marker although he still sometimes relies on one. He does not jump around the page, he does not mix up words from one sentence to another. I would not consider him perceptually handicapped at this time."

Mathematics

Before: "When he entered our class, he had been working at the structural math book and seemed to be working independently at the upper third grade level. However, he was taking cues for his math answers off the page. He would fuss around giving various answers until he elicited some response from the teacher that would clue him whether she was getting the answers from the black box or the white box, that would be his clue for working the rest of the page.

"He had difficulty thinking abstractly. The first lessons which I gave him were on symbols and symbolism. He had a very difficult time understanding what a symbol is and why we use symbols in mathematics or for that matter in writing."

After: "Dave is now able to work independently at an upper sixth grade math level. He will ask the teacher for different words on a mathematics page which he does not understand, but then he proceeds doing quite well with abstract thinking. He is even now able to work out his own methods for getting an answer to a problem."

Writing

"Dave's handwriting has improved. He first wrote a combination of script and printing. Now he is consistent in using one or the other, and his written work is always legible and neat."

Workhabits

"Now Dave works during free time, play time, even the noon hour. He is unbelievable. He works during recess in order to get his assigned work finished. And he prefers to stay in the room and eat his sack lunch while doing his work rather than go down to the lunch room to eat with the others. On those days when he does finish an hour or two ahead of the rest of the class, he has enough initiative, enough self-direction that he keeps himself busy quietly at his seat, reading, doing puzzles or working through programmed learning materials. Now when he hands papers in, they are neat, always stapled together.

He is extremely well organized. He knows exactly what he has to do. He starts in the morning by asking for the full day's work assignment, then when he is finished, he wants all of his work checked and graded. He wants his parents to know exactly how well he is doing."

Relations with Teachers

" Dave now seems to enjoy getting favorable reactions from his reachers. He likes his teachers to smile at him and is no longer embarrassed when a teacher returns a look."

Relations with Peers

"Dave has gradually become a leader in the class. He often helps the other boys when they have difficulty. He encourages the others to settle down, to read, et cetera. In public he reacts very well, keeps his presence with adults and wants to be associated with them, identified with them. I would say that Dave has now assumed a position of prestige in the class."

Delinquent Behavior

" Dave still lies some and steals some. He is not terribly upset at being caught nor is he upset if others comment about it. In fact, he is able to talk about his lying and stealing in a way which may or may not be good. Nevertheless, he no longer denies everything; denial is no longer one of his characteristic behavior patterns."

Taking Tests

" Dave has had a history of testing poorly and he still tests poorly. He blocks and becomes very anxious when taking a test."

From Miss Tall's comments, it is quite obvious that Dave has made considerable progress this past year. He still has some problems, (as evidenced by the discrepancy between her evaluation of his work and the test scores which were given earlier), a mild test-phobia, and vestiges of his old habit patterns of stealing and lying. Even so, given another year of working therapeutic exchanges in the classroom and at home, and Dave will likely become normal or above normal in every way. He has just about escaped the behavioral prison into which he had locked himself.

A Case Study: John Munsen

The intermediate class which our laboratories ran at Tudor School represented John Munsen's last opportunity before being institutionalized in a state mental hospital. He had been expelled after numerous suspensions from his neighborhood elementary school and was not permitted to enroll again in any other public school in his community. John had been expelled because over a period of years he had become an increasing source of serious problems in his class, both for the teachers and the other students. The reports from social workers and from former teachers claim that he did such things as stick pins into the arms of his classmates, bully the smaller children in his class, and fight both inside and outside school to the point of injuring several boys so badly that they required medical attention. John would leave his room without permission and travel around the school visiting his friends, either in the gymnasium, the men's room or in their class. If the other boys' teacher challenged him, he would frequently throw books from the window, overturn desks, pick fights, et cetera. Also he frequently would leave school without permission without going home until dinner time or later.

The school officials tried to be patient and understanding with John. They tried the talking approach; the principal and several teachers spent numerous hours trying to reason with him but to no avail.

He was extremely convincing at feigning penitence and repentance and clever at lying his way out of trouble. However, such patterns can only be effective until the repeated discrepancies between words and acts become obvious to all.

At that point, the school asked his mother to spend her days at school so that in the event John became unmanageable, she could take him home. However, this also was useless. John continued to become more and more disruptive, unmanageable, aggressive. Hence he was suspended several times and finally expelled.

John's parents report that for three years prior to his final expulsion from school that John had been seeing a prominent psychiatrist. Very briefly, the psychiatrist diagnosed John as having a "character disorder" or being a "sociopath". He told the parents that John very probably had a constitutional or genetic defect and that there was little that could be done to alter this. John's future was essentially doomed. He could probably receive some help by enrolling in a residential treatment school in New York, but a life of constant trouble and turmoil was predicted for him, possibly even imprisonment. The only hope the psychiatrist could offer would be to the parents, to help them to live with, that is, to cope with John's problems.

A neurologist came to a similar conclusion. John was analyzed as having a "character disorder" with concomitant hyperactivity (excessive involuntary overflow), myclonic jerk, and uncontrollable aggressive impulses. He confirmed the psychiatrist's opinion that John could not possibly be contained in a normal classroom; however, he suggested a military or boarding school where the environment could be "highly structured", "overly-protective", "preventative".

No one had ever suggested that John's behavior could have been learned, yet his family history indicates turmoil and conflict, conditions which sometimes produce children with attitudinal and behavioral problems.

John was adopted when only a few days old by middle class parents who had an older boy. For two and a half years, he enjoyed a happy family life, but then, according to the father, "all hell broke loose". For some unexplained reason, his mother became severely punitive with the boys, beating them frequently. Even the smallest mistake or slightest backtalk would be enough to incur her wrath. Concomitantly, the relations between husband and wife were deteriorating rapidly; their marriage finally ended in divorce after twenty-five years. After separation, John was passed back and forth from father and mother to boarding school until a legal guardian could be determined in the court. Finally, John's father was awarded custody after three years of bitter fighting between the parents.

John remembers this time spent alone with his father and brother as a very happy period. He had escaped his punitive mother and his father made few demands on him or his brother. This soon changed, however. The father re-married within several months of his divorce. The new mother, herself divorced after nineteen years, moved in with her two daughters.

According to two social worker reports, John deeply resented this intrusion and apparently set a course to torture his new mother. When the father was at home, he behaved well, even friendly. But when the father was gone, he became a devil. The mother reports that he would mess up one end of the house, the kitchen or the bathroom, then when she arrived to clean it up, he would move to another area of the house to tear that up. This was systematic; it would go on several hours of the day. Furthermore, he was extremely rebellious; if his new mother asked him to take out the garbage, he would dump it in the back yard. If she asked him to make his bed, he would tear it up.

Mrs. Munsen complained frequently to her husband, but he was not sympathetic to her problems. "You just don't know how to handle children," he suggested. With his father's inadvertent support, John gradually just continued to increase the pressure on his new mother. This increasing aggravation and the lack of support from her husband finally drove Mrs. Munsen to the aforementioned psychiatrist for help. It was at this point that she learned that John's problems were "genetic", that she would have to learn to cope with him. She received a few suggestions about enforcing the rules and being consistent, advice which, according to Mrs. Munsen, did not "help her much".

As John grew older, the rebellious, aggressive attitude began appearing in school where he began to have frequent trouble with the teachers and students. He had generally been a shy, withdrawn child in the primary grades, but by the time he reached fourth grade, he was a developing troublemaker. As noted, for a time, the school officials punished him in traditional ways--staying after school, paddling and finally, temporary suspension. But no improvement came. Then his mother was asked to come to school almost every day to take him home early. Finally each day she just waited in the anteroom of the principal's office until John was sent home.

This constant turmoil moved Mrs. Munsen to the edge of a "nervous breakdown". She no longer talked to the psychiatrist about John's problems, but her own. But then when John was finally expelled from school, her days became a virtual living hell. She finally retreated to her bed on "the verge of a nervous collapse". John did not ease up, however, because of his mother's illness. On the contrary, he stepped up his reign of terror at home. He would simply roam the house, taking what he wanted, destroying things and, in general, creating havoc.

Since the father felt he could not afford to send John to the residential school in New York as the psychiatrist had recommended, only two options seemed open to the father, either send John to the state mental hospital or go through another divorce. John's father had tentatively decided to send him to the state mental hospital when word came that John was accepted into a special education class. He had been rejected by the special education program earlier on the basis of the reports of the psychiatrist and the neurologist. The psychologist and the social workers employed by the special education program felt that none of their existing classes were designed for such a boy. However, when our laboratory assumed responsibility for one of the intermediate classes, and when our program seemed to be having some success with the initial four boys, John was admitted. We had asked for "the toughest problems available". Even so, John was admitted with the psychiatrist's permission only on the condition that he would begin weekly group therapy in the Child Guidance Clinic. Our laboratories and John's parents agreed; however, they never followed through. He never began such therapy.

John had been out of school for about seven months when he entered our experimental class in mid-December, a few days before Christmas recess. His sturdy physique, good grooming and pleasant smile gave no hint of any attitudinal or behavioral problems, when he joined our class. For the first two days, he sat quietly at his desk almost unnoticed by the other boys. He immediately caught on to the token exchange which had been in effect for over two months, and he worked it well. He completed his work without complaint and cooperated fully with the teachers. In fact, the experimenter remarked at the time that he could not imagine why such an attractive, well-behaved boy was in a class for disturbed children.

On the third day, however, the first shock came. While the class was on a field trip, John viciously attacked a classmate. He had to be pulled away and then restrained by the two teachers. The following day, the second such attack occurred. John jumped on a boy, knocked him to the ground, had his hands around his throat, apparently trying to choke him to death. The teachers were finally able to pull him away, however. These extremely aggressive acts were upsetting because they seemed so irrational, unprovoked and unexpected. One minute, John would be sitting quietly at his desk or standing silently watching the boys play, and the next moment he would be attacking one of them for no apparent reason. The teachers agreed at this point in time not to leave the other alone in the room with him.

Some types of aggressive disruptive behavior can be ignored successfully but John's was so severe and dangerous that it could not be ignored. Hence, we outlined a careful strategy with the teachers. When he attacked another boy in this vicious fashion, they were to physically restrain him; they were to avoid entering into aggressive games or contests with him, as had his former teachers. Rather after an aggressive act, they would restrain him, giving the other boy attention, then time him out, either in the hall or in the cloakroom. If he left the time-out room to roam through the school, the teachers were not to chase him or attempt to convince him to return; instead they were to merely inform him that his time-out period must be served before he would be allowed to join the group; that the longer he spent roaming through the school, the longer he would have to wait before he could re-enter class.

Apparently, John found the classroom, its teachers, and his fellow students enjoyable for he did not like to be timed out. In the time-out room, he would become sullen, downcast, and would frequently inquire if the time were up, if he could come back to the room. Upon re-entering the room from time out, he would often apologize to the teacher, promising not to misbehave again. At one level, the time out procedure worked very well; after that choking incident, John never again attacked anyone in an irrational, hostile way.

His other behavior continued to be problematic, however. On one day he would be a model student and the next, a devil. He would tease the boys, steal items from their desks, throw their coats out of the window, drop tacks down their backs and pull their chairs from under them; then with a sly smirk on his face, he would return quietly to his seat to pretend that he was working while the rest of the class was in complete chaos. On the day following chaos, he was likely to be quiet, industrious, sometimes working the entire day without a problem. However, on the following day he would return, only to cause more mischief. Although there were these difficulties during the first two months, as Figure 3g shows, John worked between 60% and 80% of the time available to him in the 30-minute experimental reading period each morning. Also during that period, John averaged about nine severe aggressions per week (severe, not vicious). This was not as good as most of the other boys were doing, but given his history of miserable failure and terrible behavior, we did not find it terribly distressing. He seemed to be enjoying himself in class; he liked the teachers, he liked the other boys, even though he teased them maliciously. He did not like the principal, but neither did the principal like him. He was doing much better than the psychiatrist, the neurologist and the social workers had predicted; they felt he would last not more than a month in our class.

Then about nine weeks after John's arrival, the problems with his behavior began to increase. His study habits in the morning did not change much; he continued to study between 60 and 80% of the available time. However, in the afternoon his behavior deteriorated badly. He hardly studied at all; he began throwing paper airplanes and tokens out of the window; he began stealing tokens from his classmates and hiding the other boys' textbooks; he did many other things which were very disruptive to the class. At this same time, John's parents noted a serious deterioration in his behavior at home. His attitude toward his mother had improved considerably after his enrollment in our class but now ten weeks later, he began to rebel again.

The teacher, the principal, the social workers became quite alarmed over John's increasing problems and they suggested a number of things. "He should go on drugs"; "He needs group therapy at the Children's Clinic"; "He needs a good licking". All agreed that his uncontrollable impulses were once again taking over.

Our analysis of the problem was somewhat different. The positive exchanges which we had structured for him in class were not as effective as they should have been. The teachers did not chase him, try to coerce him, argue with him or threaten him; instead they ignored him until he was ready to work, to behave. They gave him whatever attention and approval they could for good behavior. This praise exchange was somewhat effective, but the token exchange which we tried to structure simply did not interest John. He came from an upper middle class family which provided him with everything he could possibly want--a pool table, a ping pong table, several television sets, a free soda machine in the basement, food any time he wanted it, candy available at all times in the house, a stereo set, and a rather generous allowance of $3 to $5 a week. Comparatively, the back-ups which he could work for and buy with his tokens at school were nil--they simply were not an incentive for him.

Whenever a structured positive exchange fails, and this one certainly did, the remedy is to increase its power. In analyzing the situation, it was obvious to us that we would never have the resources at school to allow us to compete effectively with what he was receiving at home; hence, we put him on a different system. With his parents at home, we structured an exchange. It was agreed that he would receive the good things at home only to the extent he worked well at school. Each day John would bring home a note from the teacher which had points on it, three to one or zero. These points indicated how well he did that day, and they determined what he was allowed to do that night. Three points indicated a very good day, that he had behaved well and that he had done his assigned work. On three-point days, the parents would allow him to have all of his normal privileges--television, pool, ping-pong, friends over for dinner and so forth. Occasionally, they would even throw in something unexpected or additional, such as a baseball game or a movie. On days that John had behaved fairly well, when he had done most of his work, but had not quite lived up to expectations at school, he received two points. On two-point days, he received all of his normal pleasures minus one. In other words, his evening would be about as usual except he would be restricted from television, from the use of the record player or visit of a friend. On days when John's behavior and work were poor but he had not behaved badly enough to be sent home, he would receive one point. On one-point days, John was deprived of most of his regular pleasures for the evening, in particular, he was not allowed to go outside of the house or to have friends visit him. When he behaved so badly that he had to be sent home early before the end of school, John received zero points. On zero-point days, he was restricted to his bedroom for the evening and all privileges were withdrawn.

In addition, his daily points were added to obtain a weekly total which determined John's weekend privileges. Twelve to fifteen points indicated a weekend with all the normal pleasures plus one or two additional privileges. Nine to twelve points earned the usual pleasures minus one important one, such as visiting a boy friend, going to see a girl friend or taking in a movie. On six to nine point weeks, he would have to stay around the house most of the weekend and do a substantial amount of yard or house work. His in-house pleasures were not withdrawn but his friends could not visit him and he could not leave the yard. When he had earned less than six points for the week, John was to be grounded for the weekend--that is, he had to stay in the house with no television, no friends, no hi-fi, et cetera.

This more powerful exchange produced immediate results. John began working hard, began behaving well and the change was dramatic almost over night. Figure 3g gives some indication of the improvement in his behavior during the 30-minute experimental reading period each morning. His studying went up abruptly from an average of about 67% to about 89% of the available time. His severe aggressions went down from an average of 9 per week to .9 per week. Even in the troublesome afternoon sessions, John's behavior improved considerably. He abruptly stopped throwing things out of the window, he quit teasing other children, he stopped taking other boys' things from their desks, et cetera. Instead, he began to work on his studies a full day each and every day. From the time this system went into effect until the end of the year, there was virtually no more problems with John. In fact, he developed a very strong friendship with the other boys, charmed the teachers and even earned the friendship of the principal. At the same time, his parents reported a marked improvement at home; he even started cooperating with them, helping his mother with her household chores. He became much less rebellious, much more friendly, particularly toward his mother.

One day toward the end of spring, John was able to verbalize what he had learned. In a conversation with one of the social workers, "I've decided to be good. It's just too hard, too much work to be bad." Perhaps, but talk is easy to a person who has had the habit patterns of a sociopath. John will stay at least another year in our special class where our teachers know how to respond to him. He needs another year of working the therapeutic exchanges which we have structured in the class as well as at home before he will really feel more comfortable behaving than misbehaving. Even so, his progress and therapy to this point is beyond everyone's expectations, including our own.

It is all too easy when a boy does not respond to the normal forms of discipline in our culture to speculate that his problems are due to a genetic or organic defect and that therefore the prognosis is hopeless. If one analyzes John's history carefully, it is obvious that he had been working pathogenic exchanges which inadvertently were structured by his parents, his teachers, school officials, et cetera. Although these adults were not aware that they had structured such pathogenic exchanges, they had. As a result, as John worked those exchanges, he developed habit patterns of cruelty, viciousness, rebelliousness and at the same time, a clever pattern of lying, a charming pattern of verbal penitence that often allowed him to get away with his meanness. Of course, this is our interpretation. Even so, it was borne out by the results of therapy. When we arranged to have what we thought were pathogenic exchanges terminated so that he could no longer work them, and in their place structured therapeutic exchanges to work in the classroom and at home, John's habitual behavior patterns began to change from those of the sociopath to those of a rather normal, attractive 12-year old boy.

Secondly, John's case underlines a very important principle. When one exchange that has been structured for a child fails to be effective, i.e., he refuses to work it, the thing to do is to re-structure the situation with a new, more powerful exchange. During that ninth week when it was clear that John was reverting more and more to his earlier troublesome pattern, there was talk of giving up, of having a failure. After all, it was argued, there are limits to any type of therapy. It is better to recognize them, to avoid false expectations and useless work. However, we decided to try to have the parents restructure their exchanges at home in cooperation with the school. It was this that made the big difference for John. The new exchanges enabled him to gain control over himself, to terminate his self-destructive sociopathic pattern and to substitute in its place a more normal developmental pattern which eventually may allow him to function in society with some happiness, perhaps even to make a contribution.

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